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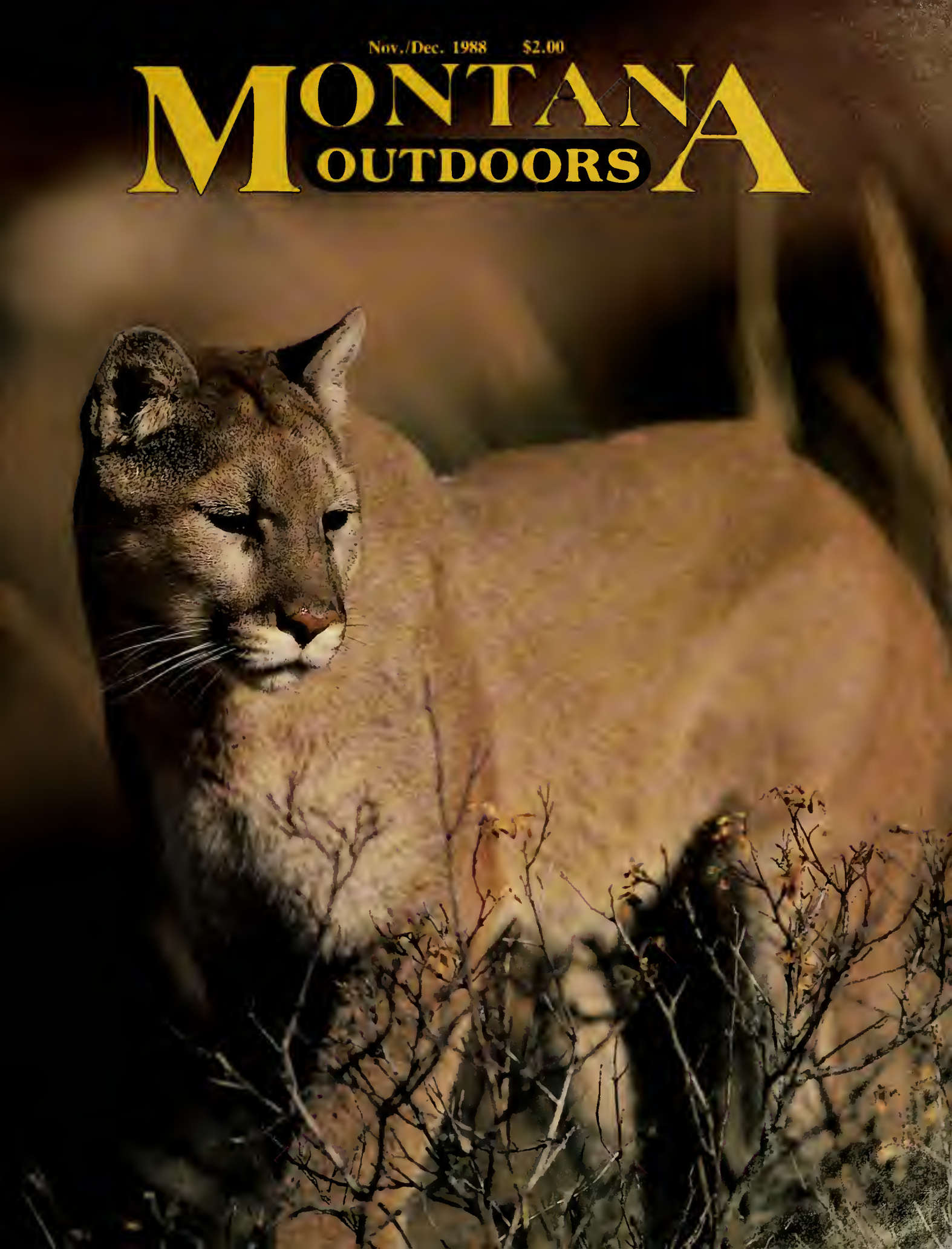
MONTANA OUTDOORS



Can you bear waiting until January? The Eighth Annual Special Photo Issue is a-brewin', and its color and dash will roust you from a long winter's nap.

Turn to page 17 for a pull-out pamphlet, "Montana Mountain Lions."

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MONTANA OUTDOORS

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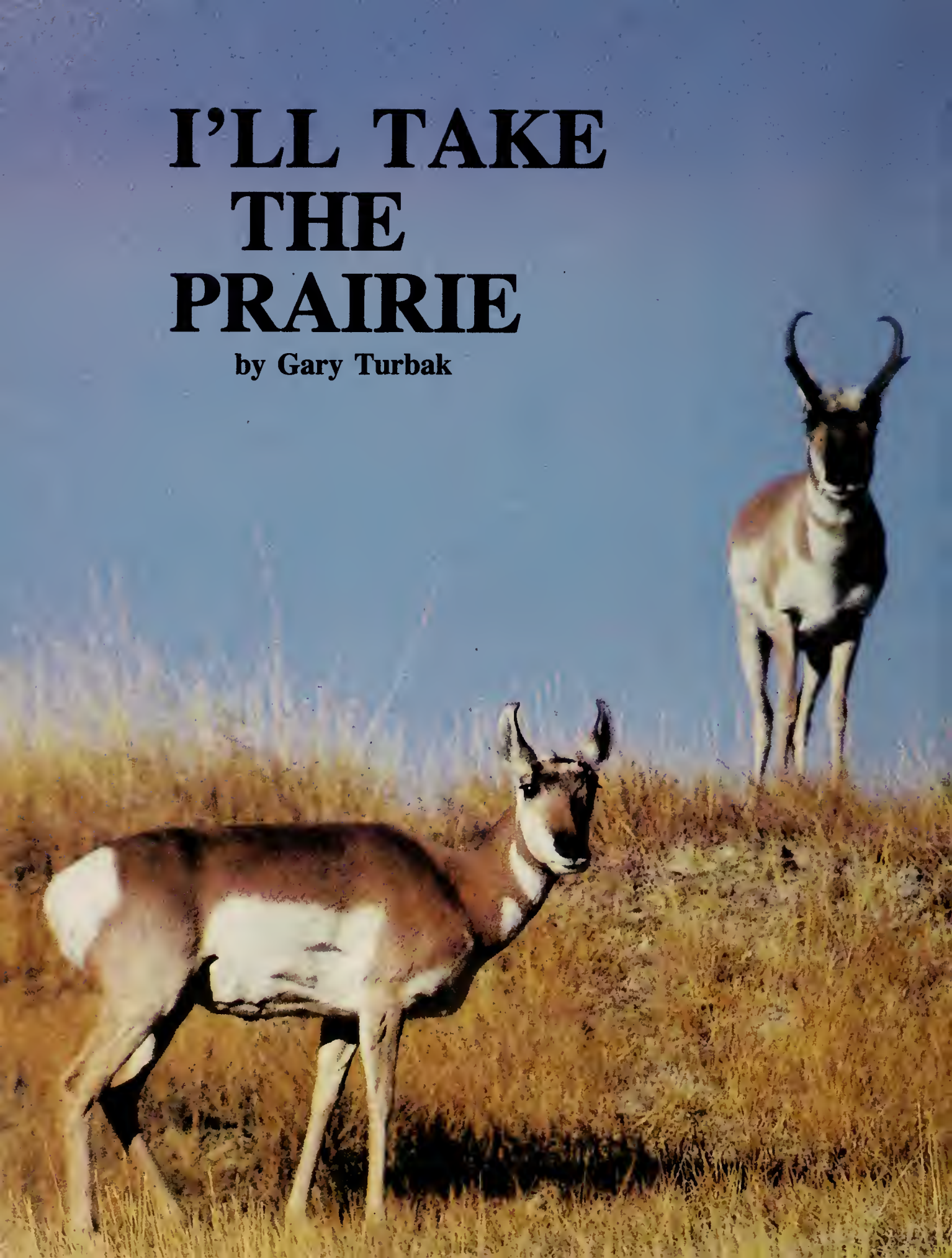
Inside Front Cover—Can you bear waiting until January? The Eighth Annual Special Photo Issue is just around the corner, and the photo at your left, by **Michael H. Francis**, is merely a teaser.

Back Cover—**Bill McRae's** article in this issue tells of a game he played with his children where they were given a nickel for each deer they spotted while on family outings. McRae's shot of three deer would have netted him only 15 cents, but the play of light and shadow and the angle of a lichen-covered tree trunk make it a winner.

I'LL TAKE THE PRAIRIE

by Gary Turbak



A HUNDRED MILES SHORT OF MY HUNTING AREA, I start to spot pronghorns along the highway. In tight little bands, they graze the grasses and newborn winter wheat. The herd buck, it seems, likes to put his colleagues between himself and the road. I suspect that many who didn't died.

It's evening when I turn off the highway and guide my rig up out of the gentle valley of the Musselshell River. Often, some well-chosen friend rides with me, but this year I hunt alone. Mule deer does already stand in the scrub pines, waiting for darkness to mask their assault on the alfalfa fields. Somewhere nearby the bucks are hiding, too smart to be seen along the road. And I know that here and there an empty-bellied coyote has already launched his night's hunt.

By the time I pitch the tent and set the Coleman two-burner to creating coffee, it's dark, and the howls of prowling coyotes ring in the blackness. I'm tempted to take my predator call, walk 200 yards from camp, and throw a phantom screaming rabbit into the night equation just to see what would happen. But something—is it fear?—holds me back. The night still belongs to the coyotes, and I'm content to let it be that way.

In the dark tent I lie awake in my sleeping bag listening to the night sounds. The coyotes are quiet now, but an owl calls not far away. He's hunting a long way from the pines, I think. The grass rustles with animal movement, and I stop breathing to listen. But it is only mice a few inches away outside the tent. Later, something larger lumbers by, and I judge it to be a skunk. I fall asleep thinking of the antelope that must surely be grazing just over the hill.

SOME PEOPLE TAKE ONE LOOK at the treeless Montana prairie and label it God-forsaken country, but I could not disagree more. Many of my best hunting memories will live forever in the dry washes and coulees and sagebrush of the prairie. I collected my first good antelope head out here where

photo: ALAN NELSON

the forest is a day's drive away. I shot my first mule deer here, too. And it was amid this sea of grass that I gained a hunting partner by teaching my wife to stalk and shoot.

Yes, I think if fate ever gets me up against the wall and I must choose for all time to live in the mountains or on the prairie...I think I'll take the prairie.

On the prairie you always know where you are and how you stand in relation to everything else. Forests are ominous and mazelike and devious. Elk are sneaky. The prairie is straightforward and honest. The antelope see you, and you see them. May the best creature win.

Each fall, when the chill morning air spangles the windshield with frost, I take the handmade .308 my father gave me and forsake the mountains for antelope country. This is, I think, a pilgrimage. A catharsis. All my little problems come undone out here where every set of tire tracks is called a road and every ranch house is an oasis. The prairie, I'll bet, is where man began. It is our primal place.

At dawn, I set out from camp on foot, discovering each new vista by way of the tiny saddles that connect what pass hereabouts for hills. The antelope are here, but they're spooky. The season has been open two weeks, and these pronghorns have made the connection between men and guns. Again and again their rumps flare white with alarm, and they speed off to safer parts.

OF THE SEVERAL WAYS TO HUNT ANTELOPE, the one that brings me closest to the essence of the prairie is slow walking. Not the three-steps-and-wait technique of the woodland deer hunter, but rather a tedious plodding with eyes always half a mile ahead. Stay low crossing the little ridges. Glass every new vista. Sooner or later—sometimes miles later—I'll spot antelope.

And along the way I'll visit the prairie. Up from the sagebrush rise a dozen sage hens, fighting to gain altitude. I swing on them with my rifle and wish for a moment that it were a 12-gauge. Later, a jackrabbit bursts from beneath my step to go zigzagging away, leaving little puffs of dust lingering near the ground. Farther on, I pass a lonely spot where one of the rancher's cows has died. A few patches of dried skin and the skeleton are all that remain. The scavengers have feasted here, and what they did not eat has returned to the earth. Next year the grass will sprout greener in this spot, and by the year after that only bleached bones will tell of the death here. Dust to dust.

About midmorning I stop walking and hunker inconspicuously in an eroded cut in the side of a hill. I glass the basin before me but see nothing. The sun is warm. I light a cigarette and inhale deeply. The rest of the year I do not smoke, but on the prairie it somehow seems right. Perhaps it makes me the Marlboro Man. I don't know.

Suddenly, two antelope top a rise 700 yards away and begin to move in my direction. When they drop out of sight behind a tiny hump of ground I take off running at an angle that should bring the three of us together. But I go barely a hundred yards before I lose my cover and am forced to hit the dirt. From here on, it's belly work.

NELSON KENTER

"On the prairie you always know where you are and how you stand in relation to everything else. Forests are ominous and mazelike and devious. Elk are sneaky. The prairie is straightforward and honest. The antelope see you, and you see them. May the best creature win."

You can't get any closer to the prairie than this. The smell of sage is strong, and it seems I can even taste it. Dust sticks to my lips. When I am not careful, my elbow or the heel of my hand finds a cactus.

The trick is to keep my butt down. Crawling on hands and knees is fast, but the profile is too high. Instead, I bring one foot even with the other knee. Dig the heel in and push, again and again. It hurts to keep my head low. My neck gets stiff and I must rest.

Finally I have cut the distance to 400 yards, and the antelope continue my way. I'll let them close the gap. When they're 300 yards out, I steady the .308 on a clump of sagebrush. I calculate that the pronghorns will pass within 200 yards of where I lie...but I am wrong.

From the north I hear the drone of a truck engine approaching. The antelope hear it too, and they begin a slow trot to the west. On opening day they would stand and wait, but too many bullets have come from too many trucks, and they have learned. In a few seconds they're completely out of range and moving fast.

The rest of the day goes no better. I plod more miles across my beloved prairie, but the pronghorns stay elusively out of range.

THAT NIGHT THE STARS COME OUT across the big sky. From my camp on a little hill I can look in every direction and see only darkness. No glowing cities or flickering ranch lights to break the blackness. Alone in the tent, I wonder what it must have been like 100 years ago to live on this treeless land when your nearest neighbor was a day's ride away. I wonder about the thousands who crossed the plains and the many who didn't make it and who now lie covered with a century of prairie sod. I drift to sleep listening to the coyotes talk to the moon.

Coyotes. They are another reason I love the prairie. One morning as the sun struggled to clear the rimrocks, I chanced to spot one of the wild dogs before it saw me. I slid into a crack between two rocks, laid my rifle across my knees, and pulled off a glove. Gently, I sucked the back of my hand until out came the tenderest squeak of a spectral mouse.

The coyote immediately began its intense search for breakfast, winding back and forth through the rocks to my right. I squeaked again, and it homed in on me. Twenty yards away, it climbed a boulder to study the strange form lurking among the rocks where only a mouse was supposed to be. Its fur glistened in the new light, and its eyes sparkled.

For a time we studied each other. Two hunters alone there on the prairie. In another time and place, the coyote would have paid for its mistake with its life. But that dawn, that coyote was worth much more to me alive than dead. Then it melted into the labyrinthine rocks and was gone. And I set off again in search of antelope.

I recall, too, the first coyote my wife ever saw. She had drawn the antelope permit that year, and I served as guide. Half a mile away that still morning, a coyote lingered on the hunt. We sat in the open next to a large rock, and I sent the rabbit over the airwaves. On a run the coyote came, hell-bent

"Coyotes. They are another reason I love the prairie. One morning as the sun struggled to clear the rimrocks, I chanced to spot one of the wild dogs before it saw me. I slid into a crack between two rocks, laid my rifle across my knees, and pulled off a glove. Gently, I sucked the back of my hand until out came the tenderest squeak of a spectral mouse."

KEITH SZAFRANSKI

for the breakfast it probably had given up hope of finding. When it had closed to within 50 yards, the predator took notice of us and began a circuitous fact-finding tour. In a few seconds, it caught our scent and was gone.

About that time, three more coyotes—in a tight fighter-pilot formation—burst over a knoll and bore down on us. It seemed that the whole predatory world had spent the night in hunger. At 25 yards, we could see their bared teeth and darting eyes. Yet on they came. Deciding not to test their gullibility to the maximum, I stood up. No animals, I think, have ever swapped ends faster than those three. In nanoseconds they changed from attacking killers into fleeing mongrels. The only creature for 40 miles around more frightened than the coyotes was my wife. It took half an hour before she settled down enough to think about antelope.

THE SECOND DAY IS MUCH LIKE the first, and my efforts to get within range fail. By late afternoon my enthusiasm has tired feet, and I begin to prepare myself mentally for an empty-handed trip home. More frequently now I spend the time on my backside glassing distant flats. Now and then I forget about antelope and marvel at the nearby rimrocks and the tenacity of the few scraggly pines growing out of them. I think about the evening photographer's light that will in a couple of hours paint the prairie hillsides gold.

Then off to my right three antelope cross at a brisk walk into a broad ravine. As soon as they disappear, I run to where I last saw them, but already they have passed out of range. They move slowly now, due north.

I drop back out of sight and begin a dog trot toward the north, paralleling their course but staying about 500 yards to the west. The hills and mounds are good to me, and I can move upright without being seen. When I have gone half a mile I come to a dry wash that runs perpendicular to my course. I turn to my right and follow the gully for a couple hundred yards. When the wash twists off in another direction, I decide it is time to make a stand. I slither up onto the flat and wait. If the antelope kept coming and if I got here ahead of them I may get a shot. The prairie is full of ifs.

At first my breathing is heavy from the run, and I am glad I don't have to shoot now. In a minute or two I am ready. But nothing comes. I consider the silliness of my situation. I lie here hugging the ground in a sagebrush wilderness not knowing if the creatures I'm pursuing are yards or miles away. I wonder how all this would appear to someone looking down from above.

Then the first head bobs into view 150 yards away. Soon all three antelope appear, grazing as they move. I take a few seconds to select the largest. A few more to let my choice put several feet between itself and the others. Then I go to the trigger. The doe runs 20 yards and crumbles.

Shaking a little, I stand. From a prone position, the prairie had appeared compacted, the distances shrunken...and now suddenly it springs open again. For a few seconds I take it all in, marveling at the vastness. It is a special place. And I'll be back next year.■

RODNEY SCHLECHT

"Of the several ways to hunt antelope, the one that brings me closest to the essence of the prairie is slow walking. Not the three-steps-and-wait technique of the woodland deer hunter, but rather a tedious plodding with eyes always half a mile ahead. Stay low crossing the little ridges. Glass every new vista. Sooner or later—sometimes miles later—I'll spot antelope."

"Most Improved": Montana's Hunter Education Program

Montana has received the "Most Improved Hunter Education Program Award" from the National Rifle Association (NRA) for activities during 1987.

Tim Pool, coordinator of the Hunter Education Program for the Department of Fish, Wildlife and Parks (DFWP), and Vince Yannone, assistant administrator of the department's Conservation Education Division, attended the NRA awards banquet in Orlando, Florida, to accept this prestigious award.

Jim Norine, director of NRA's Hunter Services Division, and Bill Bigelow, Montana-Idaho representative for the NRA, traveled to Helena in June to formally present the award to Montana Fish and Game Commission Chairman Bob Jensen and Department Director Jim Flynn.

"The department is pleased and honored to receive this recognition," said Flynn during the presentation. "It is also recognition that the state's volunteer hunter education instructors are committed to providing the highest quality safety education program to our new, young hunters and sportsmen."

Montana's Hunter Education Program has been a quality program since it began in 1957. For the last several years, the International Association of Fish and Wildlife Agencies has awarded Montana's Hunter Education Program its highest (AAA) rating. "All of the improvements initiated in 1987 are to be continued in the future to make the program's operation more efficient and effective as well as to provide the best quality information and education to its participants," Pool said.

"I was honored to attend the awards banquet and receive this award," he continued, "because I knew I was representing each and every one of the 700 volunteer instructors back in Montana. This award is shared by each of those instructors and the department. The instructors deserve the real credit."

State law requires that youths between 12 and 18 must successfully complete course work and be certified in hunter education to purchase a hunting license. Course work includes a minimum of 10 hours of instruction covering safe firearms handling, principles of game management, first aid, survival, landowner/sportsman relations, and sportsman's responsibilities/ethics. Average length of the course is approximately 15 hours. Pool emphasizes that each instructor providing the safety course volunteers his or her time and effort to provide the course to the youth in the community. Although no monetary compensation is offered, he said, each instructor receives the satisfaction of knowing that valuable information is being passed on to new, young hunters and sportsmen, thus providing a better chance that sport hunting in Montana will continue to be a safe and quality experience for all.

"We all owe so much to these volunteers," Pool said. "Without them, we would not have a program at all, much less one that could receive this award. By participating in hunter education, along with bowhunter education and other similar programs, they are providing the foundation for the continuation of sport hunting as we know it today in Montana and throughout the nation. They show that sportsmen are not only willing to reach into their pockets to support and promote their activities, but that they are also willing to help train and educate those who wish to enter their ranks."

Montana's Hunter Education Program is funded by the Federal Aid in Wildlife Restoration Act, more commonly known as the Pittman-Robertson (P-R) Act. P-R funds are generated through an excise tax on all firearms, ammunition, and bowhunting equipment. Portions of the excise tax receipts are then returned to each state, based on the number of hunting licenses sold in that state, to help fund wildlife restoration and hunter education programs. P-R funds are allocated on a 75% federal-25% state match basis. The DFWP uses a value derived from the total number of hours contributed by its volunteer hunter education instructors as in-kind payments for its share of the match.

Jim Norine, director of the National Rifle Association's (NRA) Hunter Services Division (far right) and Bill Bigelow, Montana-Idaho representative for the NRA (far left), presented the "Most Improved Hunter Education Program Award" for 1987 to Tim Pool, coordinator of the Hunter Education Program for the Department of Fish, Wildlife and Parks (second from left), Fish and Game Commission Chairman Bob Jensen (center), and DFWP Director Jim Flynn (second from right).

State Purchases Robb Creek Site

About 1,000 people gathered at Sheridan, Montana, on September 17 to celebrate the state's purchase of the Anheuser-Busch Robb Creek Wildlife Management Area (WMA) from the Missoula-based Rocky Mountain Elk Foundation.

The ceremony was originally scheduled

to take place at the site, about 30 miles southeast of Dillon. Because of fire risk, the dedication was moved to Sheridan.

The 33,000-acre WMA abuts the Blacktail Wildlife Management Area and forms a critical link in one of Montana's finest elk areas. It was under consideration as a recreational real estate development until the foundation purchased it with the help of a $500,000 donation from Anheuser-Busch Companies, Inc.

A state law expected to raise more than $3 million from hunting fee increases made possible the purchase of the land by the Department of Fish, Wildlife and Parks. The department bought the land in July for its appraised value of $1.84 million.

"The transfer of the property to the state will protect some of the best elk habitat in the world for future generations of sportsmen and conservationists," said Bob Munson, executive director of the foundation. "We bought the land hoping that eventually it would be purchased by Montana."

The dedication ceremony included the unveiling of a 10-foot-tall cairn to commemorate the historic acquisition. The cairn, featuring the likeness of an elk, was produced by Cassilly & Cassilly, a St. Louis-based firm nationally recognized for architectural art. It was presented by Raymond E. Goff, vice president and group executive of Anheuser-Busch Companies, Inc.

The DFWP predicts that range management projects intended to improve rangeland productivity will dramatically increase the area's capacity to provide essential winter range for elk and other wildlife. That translates into far-reaching gains for the local economy. According to state estimates, the larger elk herd will result in a 10% increase in elk hunter recreational days for the Sheridan-Dillon area. The "ripple effect" of hunting permits sold as a result of the land purchase will be felt throughout the region.

The Anheuser-Busch Robb Creek WMA will assure the future of both the wildlife resources and the rural region's economy. Over the next 20 years, the increases in wildlife populations, coupled with expanded outdoor opportunities, will directly translate into millions of dollars of additional revenue, according to Munson.

Elk hunters alone spend $60 million a year in Montana, according to the latest state estimates. It is anticipated that others who appreciate nature—hikers and photographers, for example—also will be drawn to the Robb Creek area to appreciate its beauty.

The area is along the north and west face of the Snowcrest Mountains in the Gravelly-Snowcrest Range, one of the most popular and accessible elk hunting regions in Montana. The topography comprises hills and low ridges at elevations between 6,000 and 8,000 feet. Vegetation includes upland grasses, sagebrush, and isolated pockets of timber. Six permanent streams flow through the area, and several springs dot the semiarid landscape.

All species of animals indigenous to the region will benefit from range improvements aimed at increasing the elk herd. The land is also home to black bears, mountain lions, mule and white-tailed deer, moose, pronghorn antelope, 57 species of birds, and 26 species of small mammals.

Living With Hunter Orange

I don't like living dangerously. Experience has taught me that. Yours truly may be daring enough to face rush-hour traffic on the San Bernardino Freeway (yes, I survived that feat, thank you), but a cliff-hanger and bridge-diver I am not. I'll leave such formidable pastimes to the James Bond, Evil Knievel types of this world for whom "living on the edge" anchors their personalities. Some guys spit in the face of danger. I try not to face it.

At least not anymore. Perhaps it's because I came so close to meeting an untimely death—rather, being killed by a friend while in the prime of my life—that I've resigned myself to a future of cruising at a steady 55 in the outside lane.

We were fraternity chums then, full-time students and some-time upland bird shooters out to breathe in the golden essence of a mid-October afternoon. Thrashing about in the ruffed grouse coverts of upstate New York seemed a great way to do it.

After leaving his pickup beside a bend in a St. Lawrence County road, Jocko, as we in the house ceremoniously named him, and I hurried our way across an overgrown cow pasture, shotguns at shoulder's rest. Our path would lead us past a decaying dairy barn owned by an old North Country scholar who'd been strapped with the unenviable task of teaching us to write. But the classroom and listening to him preach were far from our minds that day. Beyond the barn, we knew from one birdless but enlightening prior outing, lay one of the finest stretches of grouse thickets this side of Ontario.

I made the erroneous (almost deadly, as it turned out) decision to enter the tangles

first. With Jocko on my tail and slightly off to my right, I plunged headlong into a wall of thornapples so tight that I couldn't see the first bird take to the air. I could, however, hear its straight-away exit as its pounding wings propelled it out of our crowded quarters. Just then, off to my left, another whirlwind of wings sounded. As my eyes trained in on the source of the pummeling, the grouse rose to head level and rocketed forward through the trees.

It was then that my attitude toward risky business changed, for at that instant when the grouse began to level off for its glide to the safety of the creek bottom below, there came a deafening crash and boom that will ring in my mind's ear forever. Only another hunter who has found himself in such a terrifying position in space and time, if he miraculously lived to tell about it, can know the excruciating thunder of a 12-gauge's straight-on blast at 15 feet. Only that hunter, too, can know the unnerving slap-whiz-smack of streaking No. 6 shot as it punches through limbs and severs stems like a machete, raining leaves from two feet over your head. The Lord had been with me, and I knew it.

Jocko sat with his arms on his knees and his head cradled in his hands as I approached. It was clear that he was as visibly shaken by our near tragedy as I was dazed. His father's old Remington pump lay where he had dropped it, a few steps to his right.

With the choked emotions of a World Series pitcher who had just thrown a home run ball to the winning team, Jocko explained that he'd lost track of my location as I crouched with the first bird's exodus. When I stood for the second, his finger was already slapping metal. The trigger broke with little more than a touch.

Nothing else needed to be said. Permanently scarred by the experience, but with both of us still alive and intact, we picked up the pieces of our shattered outing, collected what was left of a friendship so close to an end, and headed back to the truck. We spoke little while returning to town.

Jocko never hunted with me again, although I will admit I probably wouldn't have wanted him to anyway. We both would have felt uncomfortable. Yet when I think back on the tragedy that could have been, I realize that I was as much at fault in the incident as Jocko. His mistake was losing track of me. Mine was allowing him to do so.

When the thousands of upland bird hunters set off for Montana's peaks and prairies this fall, I was among them. But nobody had trouble spotting me in the crowd. That's because on every outing since that fateful day when I was given a second shot at growing old, I've entered each birdy looking piece of real estate I've encountered looking like a blazing orange neon light. A "hunter orange" cap and an equally bright sweatshirt are always stashed with the rest of my gear awaiting next year's first trip afield. Sure, that much of the stuff does make me glow like a fluorescent light, but it certainly does the job.

That job is allowing—indeed *forcing* me—to be seen. Consider these truths from the National Shooting Sports Foundation:

(1) Fluorescent (blaze) orange is the most easily seen, recognized, bright, unnatural color against a natural background. It is the safest color for hunters to wear under all weather and light conditions.

(2) Almost 10% of all hunters have color vision deficiencies. Red clothing is no longer recommended because red may not be seen by those hunters who cannot distinguish colors correctly, and because red is difficult to see in low light.

(3) Accidents in which the victim was not seen by another hunter, in the path of his shotgun's swing or mistaken for game, rank at the top of the list of the most common types of hunting accidents.

(4) Hunter orange clothing is a tremendous aid in helping hunters maintain visual contact with one another.

Despite these statements of fact, some hunters remain skeptical about the value of blaze orange clothing and traditionally resist wearing this life-saving material while afield. The color, they say, may be seen by the game and lower their hunting score.

Fortunately, most states and Canadian provinces have stepped in and forced the issue on those skeptics by passing laws requiring certain hunters, particularly those pursuing big game, to wear hunter orange. And to quiet those doubting Thomases, studies show that hunter success has not declined in those states in which mandatory hunter orange regulations have been adopted.

Ours is one such state. Montana's current law dictates that all big game hunters (except bowhunters during special archery seasons) as well as those accompanying them must wear at least 400 square inches of hunter orange material above the waist. A hat or cap alone, like a fluorescent orange band around a Stetson, will not suffice.

No, those of you with sharp eyes, the book says nothing about blaze orange for bird hunters. But I'm going to wear it. Lots of it, too. I wouldn't be caught dead without it.

Well, er...one frighteningly close call years ago has taught me I might.—*William Phippen, information officer, Conservation Education Division, Helena*

BOOK REVIEWS

MONTANA SPACES, edited by William Kittredge, photographs by John Smart, Nick Lyons Books, available from the Montana Land Reliance, P.O. Box 355, Helena, MT 59624, 1988, 224 pages, $24.95 cloth, $2.50 postage for first copy, $2.25 for each additional copy, five copies or more—10% discount.

As Jan Konigsberg, lands director for the Montana Land Reliance, writes in the Preface to "Montana Spaces," "This is a book about Montana....To commemorate Montana's Statehood Centennial, the Montana Land Reliance commissioned a series of photographic scenes and invited significant writers to express their connection to and conception of Montana...."

I can't address the photographic merits of the book because I reviewed an uncorrected proof. But photographer Smart's stuff hangs in the International Center of Photography in New York and in the Chicago Art Institute, so I venture his photos do a superb job of augmenting the verbiage. However, I *can* say the "significant" writers do quite a job of expressing their connections to the state.

Take, if you will, Thomas McGuane. In "Runoff," he's delving into the speed with which Montana's seasons change: "By the time I got to the house, it was winter again....From my bedroom I could see great gusts of snow, big plumes and curtains marching across the pasture. Did I really catch a rainbow on a dry fly this morning?"

Take, if you will, Annick Smith, writing about her "Homestead": "Sometimes I think I am attached to my piece of ground like a spirit, like the ghosts of its immigrant settlers. Sometimes I feel rooted as the western larch and ponderosa pine. I think everything that has ever lived here inhabits the place, even the migrating birds: kestrels, snipe, bluebirds, red-tail hawks. I think the place inhabits me."

Take, if you will, David Quammen. (His contribution to "Montana Spaces" also appears in the October issue of *Outside*.) In "Strawberries Under Ice," he writes of purity and grace, of strength and fragility, of ice and of friendship: "We talked about friendship and the message of death as we all three felt we had heard it, which was to cherish the living while you have them. Seize, hold, appreciate. Pure friendship, uncomplicated by romance or blood, is one of the most nurturing human relationships and one of the most easily taken for granted."

Montana's land, water, landscapes, and spirit are celebrated in this memoir-like collection of essays. Besides those quoted, the book also contains pieces by William Hjortsberg, Ralph Beer, Wallace Stegner, Tim Cahill, Alston Chase, Gretel Erlich, Charles F. Waterman, and several others.

Konigsberg ends his Preface by noting that for now, there is still much left to enjoy in Montana. "This book celebrates Montana today in the hope that there will be just as compelling a reason to celebrate one hundred years from now." Toast Montana's Centennial by giving a copy of "Montana Spaces" to those dear to you whose most "memorable views," in William Hjortsberg's words, "have been framed by Montana windows."—*Kay Morton Ellerhoff, associate editor*

CONTRIBUTORS

• Many Montanans take one look at the treeless Montana prairie and figure it's God-forsaken country. **Gary Turbak** disagrees. "I'll Take the Prairie," he writes, because "many of my best hunting memories will live forever in the dry washes and coulees and sagebrush of the prairie." He contrasts the prairie with forests by noting forests are ominous, mazelike, devious, and that elk are sneaky. He characterizes the prairie as straightforward and honest, a place where the antelope see you, and you see them. Turbak is a full-time, free-lance writer who lives in Missoula. His books include "The Traveler's Guide to Montana," "America's Great Cats," "Twilight Hunters," and "Action-Getting Resumes for Today's Jobs." He has won awards from *Writer's Digest* magazine and the Outdoor Writers Association of America (OWAA). His articles have appeared in *Field & Stream*, *Outdoor Life*, *National Wildlife*, *International Wildlife*, and others. We're pleased to welcome him to *Montana Outdoors* where his prairie praise leads off this issue (page 2).

• Imagine this: You sleep for at least four months, maybe as long as six, during the coldest part of the year. During that time, you don't eat, you don't drink water, you don't go to the bathroom. Even more amazing, you may give birth (if you're female). What we would consider a scientific marvel is "What Bears Take for Granted." Beginning on page 11, **Tim Thier's** article brims with little-known facts about bears hibernating. For example, grizzlies den at higher elevations than do black bears, and for slightly shorter periods. Cubs are born during the winter, and the tiny creatures (10 to 12 ounces for black bears, 14 to 16 ounces for grizzlies) stay in the den with their mothers until emerging in April or May. Thier is a research assistant for the Department of Fish, Wildlife and Parks South Fork grizzly study. His master's thesis from the University of Montana in Missoula, on black bear ecology and the effects of hunting, is scheduled for completion in 1989.

• "Teaching Kids to Hunt" should be required reading for old hunters, young hunters, parents, teachers, those interested in the outdoors, non-hunters, anti-hunters, and just about anyone else. You see, it's one of those pieces with a little bit of sage advice for just about anyone. **Bill McRae**, who's long on sage advice, originally wrote it for *Buckmaster Whitetail Magazine*, and we thought its message was so important that we asked permission to reprint it. We weren't alone in assessing its merit since it also appeared in *Outdoors Unlimited*, the magazine for members of OWAA, and it won a bunch of awards for McRae in that group's annual contests. If you turn to page 15, you'll *know* why so many accolades for pictures and words have come his way. The full-time, free-lance writer and photographer lives in Fairfield; he serves on OWAA's board of directors.

• Mountain lion hunting has surged in popularity, and selective harvest requires that hunters distinguish male from female, juvenile from adult. **Gayle Joslin's** pull-out pamphlet will help hunters determine the sex and relative age of a mountain lion in the field. As Joslin writes, "Managing mountain lion populations successfully means that the music of the hounds and the thrill of the chase can remain part of our Montana hunting heritage." The "Montana Mountain Lions" pamphlet—designed to be removed from the magazine, folded, and put into your pocket—opens on page 17. Joslin is a wildlife biologist based in Helena.

• Stories about the good ol' days of anything are always appealing. We like to read how it was, and compare it with how it is. "These Trails Were Walked Before" is a "good-ol'-days"-of-elk-hunting piece, with an innovative twist or two. It's a chapter from an upcoming book by **Don Laubach** and **Mark Henckel**. The two are elk hunters (an earlier book is called "Elk Talk"), and they are about equally skilled at yarn-spinning. Their story of elk hunting in the early part of the century in Gardiner, Montana, unfolds on page 21. Laubach, a well-known bowhunter, invented an easy-to-master bugle call and a very popular cow call. Henckel is outdoor editor of the Billings Gazette; his inventive words have won kudos from OWAA and other groups. He also wrote "A Hunter's Guide to Montana," and a recently released children's book, "Make Me a Moose With No Fleas, Please."

• **John Potter** has been drawing and painting since he was 3 years old and his talent is evident in the illustrations for the elk article. Works by the award-winning Chippewa artist hang in collections all over the country. He has been the editorial artist at the Billings Gazette for the past six years. He illustrated Henckel's hunting guide and "moose" book and also "Elk Talk."

• Some people get downright testy when you ask them to put a dollar sign on a fishing experience. They feel it's none of your business and that you can't place a value on something that borders on sacred. But other land uses compete with fish and wildlife, and those uses have dollar values. Enter bioeconomics—the economics of outdoor recreation. If you want to know "The Worth of Fishing," turn to **John Duffield's** article on page 31. Here's a statistic, though, that might pique your curiosity: The average day of stream fishing in Montana is worth about $100, and the average day of lake fishing $70. Duffield is a professor of economics at the University of Montana.

• "Perspectives" about weather events, such as a "Cold Snap," differ. **Larry Holland's** perspective involves boring football games on TV, flying geese, elusive deer, and cold. Make that **COLD**. He is a teacher of literature, composition, and creative writing at Northeast Technical Community College in Norfolk, Nebraska. Turn to his perspective on page 36.

• **Randy Bishop** is an artist who specializes in wildlife and outdoor-oriented subjects. His first appearance in our pages illustrates "Cold Snap," and his work has recently appeared in *Field & Stream* and *Outdoor Life*. Of his work, he says, "I like to depict wildlife within the framework of their environment and not just studies. I also like to convey a mood, a feeling that one experiences at one special moment, on one special day, at a specific time and place." We think you'll agree, he has succeeded.

• *MO* thanks the following photographers for their contributions to this issue: **Michael H. Francis**, Billings; **Nelson Kenter** and **Bob Wiesner**, Missoula; **Paul Lally**, Barrington, Illinois; **Kerry Murphy**, Gardiner; **Alan G. Nelson** and **Rodney Schlect**, Great Falls; **Charles B. Place III**, Lolo; **Keith Szafranski**, Livingston; and **Tom Warren**, Helena.

What Bears Take For Granted

by Tim Thier

MICHAEL H. FRANCIS

Black bear cubs stay in the den with their mother until they emerge in April or May.

The female black bear slowly stirred. The sharp edge of a rock protruding from the side of her winter den was giving her some discomfort. The bright morning sunlight filtered through the snow shrouding her snug and cramped quarters, dimly illuminating her surroundings. Shifting position, she turned 180 degrees until she faced the den entrance. The wall of snow in front of her sparkled brightly, which was almost painful because her eyes were so unaccustomed to it. Frost covered the ends of roots protruding around the den entrance, giving them a fuzzy appearance. Although it was stuffy, sufficient oxygen percolated through the snow and soil. She took a deep breath and slowly let it out. A moment later, she heard a "plop" as a clump of snow fell from the branch of a nearby tree. Otherwise, all was silence. Curling into a ball until her nose was tucked into the warmth of her stomach, she drifted back to sleep, not to awaken again for several weeks.

It was February, and for the 14th time, the old bear was repeating her annual cycle of hibernating. Safe and secure, she was curled up in a shallow hole under a large rock that had been deposited by a glacier thousands of years ago. She had learned of this den from her mother, who had denned here with her when she was a yearling. Three of her winters had been spent in this den.

In late September, she had spent several days preparing the den for winter by bringing in new bedding material. She used a variety of materials found nearby—dried grass from an open slope, boughs chewed from a hemlock

sapling, and twigs from a Menziesia bush. She brought everything to the den one mouthful at a time, until finally she had made a concave "nest" about three feet in diameter and one foot thick. She had been careful as she gathered bedding materials so that neither humans nor other bears detected her presence.

The past year had been a poor one for huckleberries, her primary food for putting on fat. Even though she had spent almost all of her waking hours for two months in search of this tasty fruit, she had entered the den with less than her usual amount of stored fat. Because of this, she had not given birth in January and was now alone.

* * * * *

The situation described is typical for Montana's black and grizzly bears. Each year, they repeat a cycle of building up stores of fat, preparing a den, hibernating for four to six months, and emerging in the spring to begin the cycle anew. Their ability to subsist for six months during the coldest of weather without eating, and at the same time give birth and rear young, is no less than a scientific marvel.

Although the winter sleeping habits of black and grizzly bears are similar, there are some differences. Grizzlies usually den at higher elevations, above 6,000 feet, and for slightly shorter periods than their black cousins. Also, grizzlies usually select open sites on steep slopes with well-developed soils, often near the head of an avalanche chute. A grizzly tunnels straight into the hillside, usually without any supporting structures like trees or rocks over the den entrance. Both black and grizzly bears occasionally use naturally formed cavities such as small caves. One such den found in the Whitefish Range of northwestern Montana had probably been used for many years, perhaps hundreds. Although they favor north slopes for dens, both black and grizzly bears den on any aspect.

Black bears are more adaptable than grizzlies when selecting den sites. Most often, a black bear's den is a hole dug under a tree, rock, or the roots of an upturned tree. They also den in the base of hollow trees, inside hollow logs, and

TIM THIER

Mites sometimes burrow under the skin of a hibernating bear's face, causing the hair to fall out and giving the bear a "bald" look when it emerges from the den. Bears commonly shed or slough the pads on their feet while they're in the den, a phenomenon that has researchers puzzled.

TIM THIER

even above ground by curling up under low-hanging branches of a tree or at the base of an overhanging ledge. Biologists have documented a number of black bears in Montana denning 50 to 70 feet above ground inside large, hollow trees. More tolerant of human activity than grizzlies, black bears also den inside slash piles and under haystacks. In fact, in a one-mile stretch of northwestern Montana, researchers located 24 black bear dens under large cottonwoods, all within 200 yards of a major highway!

Most bears, both black and grizzly, use some kind of bedding material in their winter dens. Once again, black bears are less restricted than grizzlies in what they use—wood chips, dried grass, moss, beargrass, dried forbs, tree boughs, and branches from bushes. Grizzlies in northwestern Montana use beargrass almost exclusively; however, in the Yellowstone area, they usually use tree boughs. Bears use whatever materials are easily available, with some using no bedding material at all.

Bears usually den alone or with their young, but occasionally denning conditions are so favorable that bears den close to one another. Researchers had documented group denning of female polar bears, but it was not well documented for black and grizzly bears. The example given earlier of concentrated black bear dens in northwestern Montana is probably the best one in all of North America. Few examples exist for grizzlies, but in the Mission Mountains several years ago, researchers found five suspected grizzly dens within 100 yards of one another.

Information from radio-collared bears shows that both black and grizzly bears usually spend from two to four weeks in the immediate vicinity of their den before entering it for the winter. They spend at least part of this time preparing it. However, they may also experience "prehibernation lethargy." This condition exists after the bear has accumulated large reserves of fat; its metabolic rate slows, it seems less alert, and moves less. Bears don't usually enter their dens for the winter until after a heavy snowfall.

The notion that bears indeed hibernate has been somewhat controversial. In the mammal world, ground squirrels, marmots, and bats were thought to be among the true hibernators. These animals survive winter's cold because their body temperature drops to only a few degrees above freezing. They become very stiff to the touch, and are not roused even when handled. Their respiration slows to only about one breath per minute, and their heart to only about three to six beats per minute. Periodically, they must stir from their torpor to defecate and urinate. Before going back to sleep, they may eat or drink if food or water is available.

Bears, on the other hand, reduce their body temperature only slightly and their heart and respiration rates moderately when hibernating. They are somewhat easily aroused and can defend themselves if necessary. Unlike other hibernators, they are able to recycle their nitrogenous wastes and do not urinate or defecate while denned. Since their nitrogenous wastes are completely recycled, there isn't a loss of lean body mass or muscle tissue as is true with other hibernators. With the exception of oxygen, all metabolic requirements are provided by their layer of stored fat. For these and other reasons, bears are now not only considered to be true hibernators, they may in fact be the *ultimate* hibernators!

The one thing that makes all these things possible for bears is their stored fat. It's the "fuel that keeps the fire going" and allows their bodies to perform other amazing functions as well. Making sure they have enough of it for the coming winter is the driving force in much of what a bear does. Most of its fat comes from eating foods high in carbohydrates, such as berries. In Montana, huckleberries are probably the most important fruit for bears, followed by serviceberry, buffalo-berry, chokecherry, and Douglas hawthorn, to name a few. Since grizzlies are equipped with long claws for digging, they are able to use a food source that black bears can't: roots. Biscuitroot, springbeauty, glacier lilies, and yampa are all high in carbohydrates and starches and are readily dug by grizzlies when available. Nuts from whitebark pine are also important, especially to grizzlies in the Yellowstone ecosystem.

The vast majority of the fat that bears need to survive hibernation is accumulated during late summer and early fall. Bears undergo a period of activity referred to by some researchers as "hyperphagia"—bears are eating much more than they need for simple sustenance. Almost all of their waking hours are spent eating or searching for food. The amount of food consumed can be enormous. Researchers estimate that grizzlies can eat up to 80 pounds of berries a day if they are plentiful. The amount of weight gain can be startling. Grizzlies have gained over 100 pounds in less than a month!

Although bears breed in spring and early summer, a special adaptation called "delayed implantation" prevents the female from giving birth until January when she is snug in her winter den. The ova divide or "cleave" several times following fertilization, but do not immediately implant in the wall of the uterus as is otherwise common. Instead, the ova (now called "blastocysts") remain free-floating in the Fallopian tubes until after the female enters the den in October or November. Then, only if the female has acquired sufficient fat reserves to sustain not only her but also her newborn cubs, will the blastocysts implant and embryo development begin. Embryos develop in only about 2 1/2 months. If the female hasn't accumulated sufficient fat reserves, birth doesn't occur. Females usually give birth to two, sometimes three, cubs. The level of fat may affect the number of cubs produced. This mechanism helps regulate bear numbers when food is scarce and also prevents the female from undergoing undue stress.

When born, cubs are tiny—about 10 to 12 ounces for black bears, and about 14 to 16 ounces for grizzlies. They stay in the den with their mother until they emerge in April or May. At this time, the milk they get is derived solely from the breakdown of the female's stored fat. This milk is extremely rich, with a fat content of 25% to 33% (cow's milk contains only about 3% fat.) It's so nutritious that almost all of it goes into growth, with little excreted as waste by the young cubs.

During hibernation, bears generally lose 15% to 20% of their body weight as their stored fat is metabolized. When they emerge, they are not as emaciated as many people believe. Instead, they are in relatively good shape, but they continue to lose weight until late June. It is not until berries or other high carbohydrate foods are available in late summer that they begin to regain weight in noticeable amounts. The grasses and forbs they eat in the interim merely help sustain them.

Because of annual variations in the availability of certain kinds of food, the weight of individual bears varies widely from year to year when they enter the den. For example, researchers in northwestern Montana captured two adult male grizzlies in fall of 1978. It had been a good year for huckleberries, and each bear weighed from 600 to 650 pounds. A year later, both bears were again captured in the fall, following an extremely poor huckleberry year. Each bear weighed 200 pounds less when recaptured than it had a year earlier, representing a decrease in size of about

TIM THIER

Black bears may excavate a den under a tree, rock, or the roots of an upturned tree (above), or seek shelter in a cave, a hollow tree, or a hollow log (below).

TIM THIER

one-third! Nevertheless, both denned successfully and researchers didn't notice any negative effects from the decreased weights.

Occasionally in spring, hunters or others will spot a bear with hardly any hair on its face; sometimes the hairlessness extends as far back as its ears. This lack of hair makes it look a bit strange. The "baldness" is caused by a tiny mite that burrows under the skin on the bear's face while it is in its den. This causes the skin to flake and the hair to fall out. Research in Colorado suggests that bears that den in caves or rock cavities are more likely to experience mite infestations than bears that choose other types of dens.

No one is really sure what factors cause a bear to leave its den in the spring. Warm weather probably plays a minor role, but the timing of den emergence doesn't seem to change much from year to year, regardless of spring weather. Day length may be a factor. Researchers *do* know that even though bears emerge from hibernation, they do not usually leave the den site for several weeks. Instead, they lounge around the den opening, maybe making a bed outside from boughs or other materials. In examining the dens of two grizzlies soon after they left, I found both extremely wet. Melting snow had dripped down through the roof of the den. Quite likely, the bears simply found it drier outside. Since bears in captivity do not eat for two to three weeks following hibernation even when food is available, bears in the wild may conserve energy if they stay near the den instead of immediately venturing away. Adult males are usually the first to emerge in the spring, followed by subadults and females without young. Females with cubs are the last to emerge. This sequence is reversed when bears enter the den in the fall, with pregnant females entering first.

Scientists have long been interested in bears and their ability to hibernate, and knowledge of how it works has many important implications for people. For example, if hibernation could be induced in people, long distance space travel would be much easier and large stores of food would not be needed. Also, astronauts would not have to contend with boredom. Bedridden patients would benefit if scientists could find out not only why the muscle tissue of bears doesn't atrophy while they are hibernating, but also why they don't succumb to osteoporosis. Cardiologists would like to know how bears are able to put on high levels of fat each year, but never show evidence of cardiovascular disease.

Dr. Ralph Nelson of the Carle Institute in Illinois has been a leader in research on bear hibernation and he has been able to apply some of his results from bears to humans. He has been able to prescribe diets for human patients on dialysis so they need their blood cleaned mechanically only once every 10 days (which would be the equivalent of urinating once every 10 days for healthy people). On a recent visit to Montana, where he collected blood from wild hibernating black bears to use in his work, he told of a patient on dialysis who has gone 89 weeks without drinking a glass of water and never feels thirsty! Denning and hibernation are fascinating aspects of a bear's behavior and physiology that we may never fully understand. With time, questions will be answered and what bears take for granted will prove of tremendous value to humans. But for now, I'm content knowing that when the snow is blowing and life is just short of being miserable, Montana's black and grizzly bears are handling the situation better than anyone, or anything, around.■

Teaching Kids To Hunt

story and photos by Bill McRae

When my father died in 1959, he didn't leave me an awful lot of this world's goods. I've never felt bad about that because he did leave me a lot of things that were more important, such as memories of a kind and understanding man. And, although no one has ever mentioned it, I've always figured that I inherited his sterling Scotch wit and rugged good looks. He also left something that has given me a lifetime of enjoyment. He taught me to hunt.

In teaching youngsters to hunt, safety gets top priority. The lessons learned in Montana's mandatory hunter safety course need to be continually reiterated and expanded upon, until they become an ingrained part of everything one does afield.

It was all so long ago that it seemed as if it happened in another world, and sometimes it's even hard to recall what he looked like, but I can vividly remember Dad teaching my brother and me to shoot the Remington Model 512 .22 caliber rifle, and how proud we were when we'd knock tin cans off the fence posts across the gully from the barn. He must have emphasized the importance of having the hill for a backstop because the thought stands out in my mind. Then there was that first deer camp in the "north woods" of Wisconsin. I had never before camped with snow on the ground and, as we pitched the tent, I wondered if we might not freeze to death. We didn't. I blew a chance for a big buck that trip and felt that I had let everyone down, but Dad comforted me, and later, when I finally did get a deer, he was there to field dress it for me, explaining how it should be done. I doubt that I paid much attention but, when the time came that I had to do it on my own, I knew how.

With a heritage like that, I guess it was only natural that Mary and I taught our four children, Tim, Mark, Mike, and Colleen to hunt. Hopefully they will be able to do likewise. Henry Adams said, "A teacher affects eternity; he can never tell where his influence stops."

Before getting into what's involved in teaching kids to hunt, a couple of points must be made: (1) No child should ever be pressured into hunting if he or she doesn't want to do so. (2) As a parent or friend of a young person who does enjoy hunting, you must understand that there will be times when other interests—dating, sports, cheerleading, etc.—will lure them away. Don't worry, they will be back.

One of the first things I learned when I started hunting with our youngsters was that children are like cub bears which have to be taught how to hunt and care for themselves in the wild. It sometimes seems they don't do anything right by instinct, and it's a mistake to assume that they will.

Safety, of course, gets top priority. The hunter safety courses that most

continued on page 25

MONTANA MOUNTAIN LIONS

(Felis concolor missoulensis)

by Gayle Joslin

BOB WIESNER

Adult male

CHOOSING A TROPHY

Tips on Sex and Age Identification In the Field

Lions, lion hunters, and hounds in winter mountains and forests produce a rare recreational experience. Managing mountain lion populations successfully means that the music of the hounds and the thrill of the chase can remain part of our Montana hunting heritage. Sustaining this vigorous and demanding sport requires preserving healthy lion populations. Mountain lions will never occur in great number because they are solitary animals that require large territories. Because the sport of lion hunting has become so popular, management now requires selective harvest. This brochure discusses how that can be done.

The sex and relative age of a mountain lion *can* be determined in the field. Information to help hunters tell the sex and age of their quarry is presented in this brochure. Proficiency in applying these techniques requires perceptive, on-the-ground study, and diligent practice. The discriminating hunter generally will be able to distinguish between juveniles and adults, as well as between adult males and females. Luckily, through their traits and habits, adult males are the most easily identified. Uncertainty creeps in as the hunter attempts to discriminate between subadults and adult females. By applying these identification techniques and selectively harvesting males, the hunter will further the goals of mountain lion management in Montana. The information presented here combines available literature with the expertise and practical knowledge of biologists and sportsmen with years of experience in the study and pursuit of North America's biggest cat. Using this information will help the hunter select the finest available trophy and will assure healthy lion populations.

Mountain Lion Management

Historically, the mountain lion has been a poorly understood and often maligned species. The status of mountain lions in Montana has evolved from that of predator, on which a $50 bounty was offered until 1962, to designation as a big game trophy species in 1971. The change in legal status reflected growing public appreciation and concern for sound mountain lion management.

Today there is more interest in mountain lion hunting than ever before, and this fascination is expected to increase. Because the potential exists to overharvest mountain lions in some areas, it is important to carefully regulate the lion harvest, in particular the harvest of females. Beginning in 1988, all mountain lion hunting districts in Montana were managed under a total quota system. Most districts also have a female subquota. The objective of the quota system is to prevent overharvest and to direct hunters to areas receiving less hunting pressure. Although females with kittens have been legally protected in the past, the subquota system is more refined and effective in protecting the reproductive potential of hunted populations. In hunted populations, harvested males are quickly replaced, but replacing reproducing females takes much longer. On the quota system, more males may be taken than females. Because a separate quota exists for females, hunters should possess the knowledge and skills to distinguish between the sexes.

Distribution

The mountain lion exists only in the Western Hemisphere. Despite its name, the mountain lion lives in habitats ranging from desert, chaparral, and badland breaks to tropical jungles and subalpine mountains. About 30 subspecies of mountain lions occur across North and South America, with 14 inhabiting the area from Canada to Mexico.

In Montana, only one subspecies, *Felis concolor missoulensis*, occurs, primarily in the mountainous western and central coniferous regions of the state, and along major drainages of the Yellowstone River. Occasionally, lions (probably dispersing young) have been observed and killed in areas removed from

Distribution of mountain lions in Montana

folding instructions

known lion range. Where lions occur throughout Montana, their distribution is closely associated with that of deer and elk.

Life History

Although females are capable of breeding their second year, they probably do not do so until their third or fourth year, by which age they normally have established a territory. Mountain lions are generally polygamous. As breeding receptivity approaches, females may be quite vocal, producing loud screams. Males often travel 40 to 60 miles in search of females. A mating pair will remain together only a few days and then the female will no longer tolerate the male nearby.

Care of the young rests solely with the female, and she defends them vigorously against male intruders which pose a lethal threat to kittens.

Deer, elk, and porcupines compose the majority of the mountain lion's diet. Lions prefer to kill their own meat, and may devour an entire carcass over the course of a few days. They remove the innards and eat the internal organs first. They cover the carcass with leaves and twigs or snow between feedings, probably to delay spoilage. They generally move the carcass and re-cover it after each feeding.

The home range of territorial females varies from 40 to 103 square miles, while that of territorial males varies from 75 to 222 square miles. The territory of a female with kittens is generally smaller than that of a lone female. The large territory of the male may overlap the territories of several females.

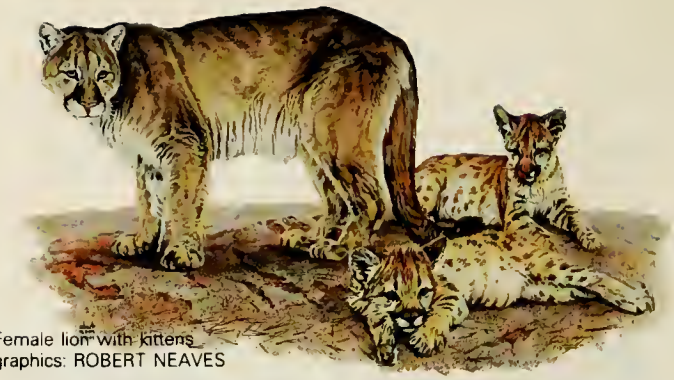
Physical Features

Body Size and Weight—At birth, kittens are about 8 inches long and weigh approximately 14 to 17 ounces. Growth information for juvenile lions is lacking, but approximately 70%-75% of the adult weight is achieved during the first year. Adult females average 94 pounds and may be up to 7 feet long. Weights of adult males may exceed those of females by 40%. Adult males reach an average maximum weight of 155 to 160 pounds and may be longer than 8 feet. Muscular development of the neck and shoulders gives the male a more husky appearance, while the female appears lean and willowy.

The size and shape of the head is a relative indicator of sex. The

ALAN NELSON

Kitten



Female lion with kittens
graphics: ROBERT NEAVES

head of a full-grown male is large and round, like a basketball. The heads of females and juveniles appear more heart-shaped than round. In relation to the size of the head, the ears of a male appear small and situated farther apart (more on the sides of the head), while the ears of females and juveniles appear large and are situated on top of the head.

Coloration—Adult mountain lion pelage ranges from plain grayish or brownish to rich cinnamon or tawny. The backs of the ears and tip of the tail are black, and black markings occur on the face. The vertical black stripes over each eye in the prime adult disappear with old age.

Mountain lion kittens have spots and tail bars that begin to fade at about 2 months and may be gone except in the hip area by 8 to 10 months. Transverse black bars on the inside of the forearm may persist until 2 to 3 years of age.

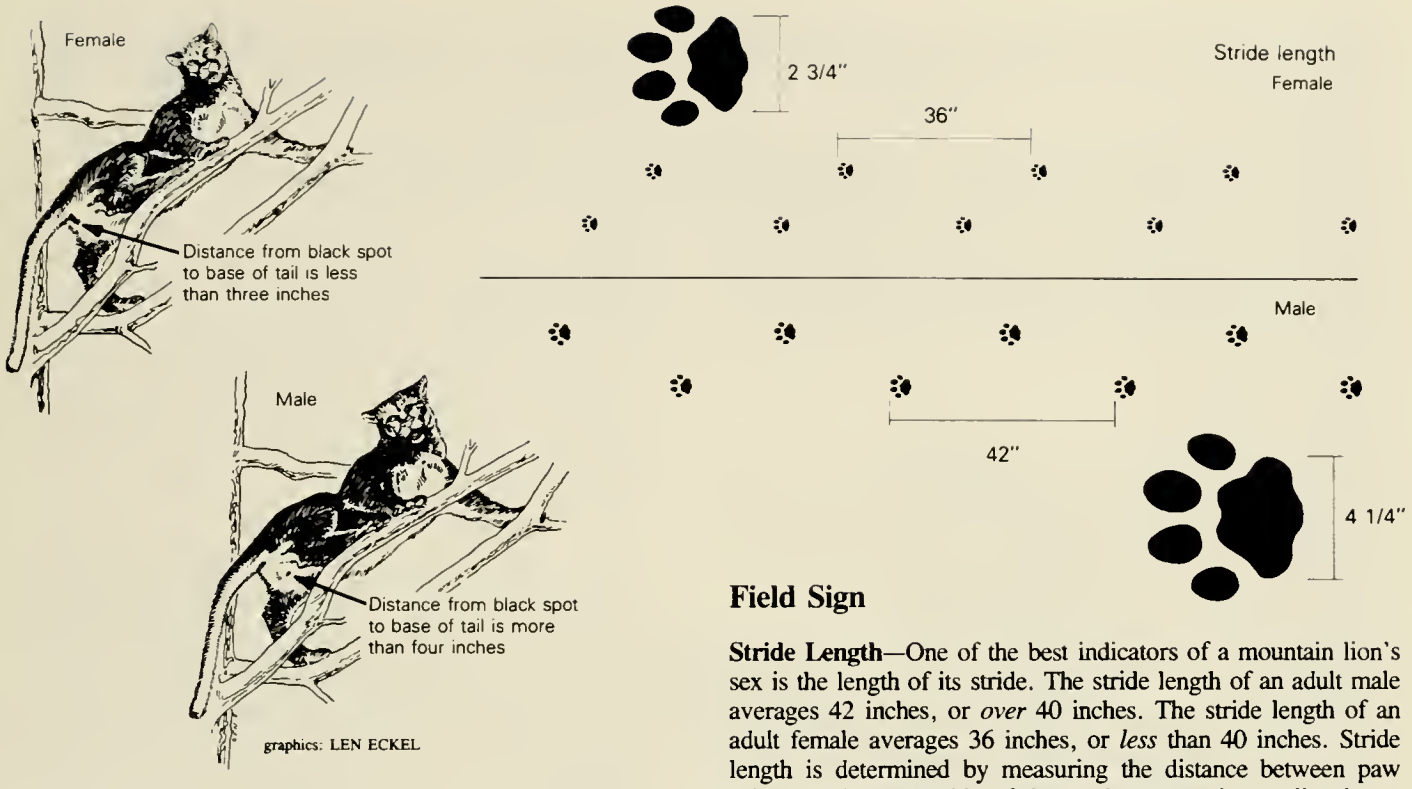
A black spot circling the opening of the penis sheath characterizes male lions. Females have dark gray or black fur surrounding the vulva. The distance between the base of the tail and the spot on the penis exceeds 4 inches, while the dark area around the vulva is 3 inches or less from the base of the tail.

Behavioral Features

Disposition—The astute hunter may be able to assess the disposition of a treed lion. A female with young kittens often will not travel with her offspring, so on two of three occasions, if a female is treed, she won't be accompanied by young. Such a cat

TOM WARREN

Juvenile



may appear to be quite agitated, pacing or constantly moving in the tree. In addition, nursing females are usually thin and their fur may be worn around the nipples. On the other hand, an adult male may appear relatively calm. The hunter's experience and intuition must be stringently exercised.

Movements—The female lion wanders more within a smaller area than does a male, particularly during hunting expeditions. If a hunter assesses the movement pattern of a lion, the male seems to travel from point to point in more of a straight line. Although he may double-back, zigzag, and circle around, his overall pattern of movement seems to be oriented toward a specific direction. Determining whether a cat's movements are directional requires astute observation.

KERRY MURPHY

Adult female

Field Sign

Stride Length—One of the best indicators of a mountain lion's sex is the length of its stride. The stride length of an adult male averages 42 inches, or *over* 40 inches. The stride length of an adult female averages 36 inches, or *less* than 40 inches. Stride length is determined by measuring the distance between paw prints on the same side of the track pattern, i.e., a lion has a staggered track pattern because one foot is not placed directly in front of the other. Measurements should be taken of alternate tracks (see illustration) as the lion *walks* on a flat surface (not moving up or down hills). Measurements should be taken from the *center* of a hind foot to the center of the next imprint of the same hind foot. Four measurements should be taken at each of three or four locations, then averaged.

Track Measurements—In an unhurried walk, lions usually place the hind paw in the imprint made by the front paw. The hind paw has three distinct lobes at the base of the pad and is slightly smaller than the front paw. Track length is measured from the end of the toes to the back of the pad. Track width is measured at the widest point on the outside edges of the toes. In deep snow, the fifth toe on the front foot may be visible in the track. The hind foot has four toes.

Ideally, track and stride measurements should be taken made on

BOB WIESNER

Adult male

similar ground conditions to reduce variation. Track width of an adult male is greater than 3 1/2 inches and usually ranges between 3 1/2 and 4 1/2 inches. A female's track is less than 3 1/2 inches and usually ranges between 2 1/2 and 3 inches.

Groups of Tracks—The mountain lion is a solitary animal. Adult males almost always travel alone. Young generally remain with their mother for 1 1/2 to 2 years. Breeding pairs associate for less than two weeks (often only three days). If tracks indicate two or more lions traveling together, this usually is a family group. Pursuit of one individual from this group will almost certainly result in the treeing of a juvenile or female lion. If the hunter's goal is to kill a large lion, tracking an animal from a group of lions should be avoided.

Scrapes—Females rarely scrape. Adult males use their hind feet to scrape duff into a small pile to declare their territory. Scrapes range from 6 to 18 inches long, 6 to 12 inches wide, and 1 to 2 inches deep. Most often, scrapes are found at the base of the downhill side of a tree, along lion travel corridors such as passes, creek crossings, mouths of canyons, and ridges. Feces or urine are associated with scrapes about 20% of the time.

Identification Checklist

No single identification technique described here should be used alone because no one method is always effective in distinguishing the age or sex of a lion. The following traits, listed in descending order of accuracy, should be assessed and used in combination: groups of tracks, stride length, presence of scrapes, genital markings, head size, body build, track width (quite variable, depending on surface). The lion hunter has an advantage over other big game hunters because field clues can be analyzed for indications of age and sex before the actual lion is observed (be sure to carry a pocket tape measure). Once the lion is in a tree, it can be maneuvered to get a better view of genital markings (binoculars can be very helpful). Once the lion is at bay, you have plenty of time to study it. *If you are unsure about the age or sex of your target, don't shoot.* When conditions confound your confidence in determining a lion's age and sex, chances are good that the same lion will be encountered on another hunt under better circumstances.

Adult Male:
- travels alone,
- stride length over 40 inches, usually solitary,
- scrapes almost always indicate an adult male,
- 1 1/2-inch black spot at the tip of the penis sheath, at least 4 inches from the base of the tail,
- large, round head; relatively small ears, toward the sides of the head,
- muscular neck and shoulders, bulky abdomen,
- over 120 pounds,
- track over 3 1/2 inches wide,
- relatively calm behavior, and
- old animals often have broken teeth.

Adult Female:
- often travels with young,
- stride length less than 40 inches, solitary or associated with young (females associate with males only for a few days every 1 to 2 years),
- only rarely will scrape,
- dark gray or black coloration around the vulva, within 3 inches of the base of the tail,
- heart-shaped head, relatively large ears on top of the head,
- lithe, slim body without heavy muscular development of neck and shoulders,
- less than 120 pounds,
- agitated, nervous behavior in the tree if she has young,
- worn fur around nipple area if nursing, and
- track less than 3 inches wide.

Juvenile
- often travels with mother and or sibling(s); usually with mother for 18 to 24 months,
- stride length less than 40 inches,
- heavily spotted coat until 2 months old, spots persist in hip area until 8 to 10 months,
- dark, transverse bands (fade with age) on the inside of the forelegs may persist until 3 years old,
- does not scrape,
- heart-shaped head, and
- track width of male juvenile may be over 3 inches.

Hunter Requirements
- The hunter must personally report a lion kill within 48 hours to an employee of the Department of Fish, Wildlife and Parks (DFWP) in the administrative region in which the lion was taken.
- Within 10 days of the kill, the head and hide (with evidence of sex attached) must be presented to a department employee in the DFWP administrative region in which the lion was killed for the purpose of inspection, tagging, recording of kill, and issuance of a trophy license.
- If requested to do so, hunters must return skulls.
- After the quota in a district is reached, the harvest season closes and a chase season becomes effective for the rest of the hunting season.

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Contributors

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These Trails Were Walked Before

by Don Laubach and Mark Henckel
illustrated by John Potter

MOST HUNTERS ENJOY fantasies about the good old days. They sit on a mountaintop, look off into the far-away haze, and dream about what it must have been like a century ago in their chosen hunting country. Elk hunters are no different, especially novice elk hunters. Once they see the breadth and scope of elk country and get their first taste of hunting for elk, they get caught up in the romance of the whole thing. Their minds wander to make-believe times in what they feel must be elk hunting's colorful past. They figure elk must have been everywhere. And, in some ways, those hunters are right.

If you go far enough back in time, there were six subspecies of elk in North America—the Rocky Mountain, Roosevelt, Manitoban, Eastern, Tule, and Merriam. They roamed, in varying concentrations, all across most parts of what would become the United States and Canada. But to talk about those subspecies, you have to go way back to the time before white men learned that elk meat was fine table fare. Once 17th-, 18th-, and 19-century settlers found that elk were good to eat, that their hides could be bought and sold, and that their stained ivory teeth made fancy decorations, the elk's fate was sealed. They went the way of the passenger pigeon in all but a few select areas of the Rockies and the Pacific Northwest.

In fact, widespread availability of good populations of elk in recent times is pretty much a product of the 20th century. Elk transplants, most of them from the Gardiner, Montana, and Jackson, Wyoming, areas and nearby Yellowstone and Grand Teton National parks, were responsible for bringing elk back to the mountains of the West and other parts of the country. Because of the decimation of other elk subspecies, the only huntable elk we talk about today are the Rocky Mountain and Roosevelt elk, with the Roosevelt living in the mountains of the Pacific Northwest and the Rocky Mountain spread throughout the Rockies of the United States and Canada. Other huntable populations are limited indeed and strictly the result of transplants from the Rockies.

Because so few elk made it past the years of settlement, most elk hunting is living its good old days right now. The end result of the transplants and the benefits of wildlife management have provided more opportunities for more elk in more places than at any time in the past hundred years. Aside from scattered herds which survived the onslaught of settlers' and miners' guns and the land-altering changes of development, most elk populations are relatively new in time. Many, in fact, may be only decades old. And the hunters who are dreaming of times past may find that there wasn't much of a past to dream about where they hunt.

That doesn't mean there isn't a colorful history to elk hunting itself, however. If you just pick the right place to do your dreaming, you can find more local color than you ever imagined. Gardiner, Montana, is certainly one of those places

where you can gain a little historical perspective on where we've been in the past.

THE GARDINER AREA, on the northern edge of Yellowstone National Park, has always been elk hunting country, thanks for the most part to the park itself which was set aside by Congress in 1872. Here, elk never disappeared, and although their numbers fluctuated over time, there was always a big enough population to support widespread hunting.

It was to Gardiner, for example, that then-President Teddy Roosevelt came in 1903 to re-dedicate the arch at the park's north gate and do a little elk hunting while he happened to be in the neighborhood. It was here, too, where the rich hunters from the East came to put those big trophy heads on the wall. And it was here where my dad headed when it came time in 1915 to put away a supply of meat for the winter.

Grandfather was a homesteader, trying to scratch out a living in the Crazy Mountains nearly 100 miles to the north and east of Gardiner. There were no elk in the Crazies then, and few deer. So he sent his three sons in a horse-drawn wagon for the three-day ride to hunting country. They hunted then in the Slip 'n' Slide Drainage, the same name the area goes by today. And, according to my dad's recollection, they bagged three elk after several days' hunting. They then loaded their elk and rode the three days back to the Crazy Mountains, after stopping to buy hay in Emigrant along the way. As I recall, the story went that my dad always felt he got took on that hay purchase. But then I guess he probably wasn't the first hunter to feel he was taken while away from home on a hunting trip. And, whether we like it or not, I'm sure he won't be the last.

No one ever told me, but I'm sure the three elk carried in the back of that wagon were all cows. It wasn't that my dad wasn't good enough to bag a bull. It's just that in those days almost everyone bagged cows by choice. Bulls were lean and tough. Cows were fat and tender. And considering the fact that they were shooting elk for meat, it's unlikely they would have taken a winter's worth of lean and tough eating by choice. That tendency to shoot cows instead of bulls was the hard and fast rule, rather than the exception, in those days.

If there was a difference in his hunt, it was the fact that he came here by wagon. In the early days of this century, most hunters came to elk country by train. There was a railroad spur that split off the old Northern Pacific line at Livingston and headed southward to Gardiner and

Yellowstone Park. Hunters would catch a ride on the train and be dropped off at various points along the way to do their hunting. Then, when they got their elk, they would load it back on the train for the trip back to other parts of Montana or points farther east. It was a colorful scene, with the hunters and their elk, and a romantic time to be an elk hunter. But most elk taken were still cows, shot by the local miners or others from inside and outside the area. The miners would shoot them all year and elk remains can still be found beside their rotting old cabins. The hunters would come out in fall and early winter and do the same.

IF THERE'S A SURPRISING ASPECT of elk hunting, it's how long the desire to shoot only cows hung on. Wayne Hoppe, for example, was born in the Gardiner area and helped his grandfather, Walter, and his father, Paul, in the guiding business before taking it up himself after World War II. He was in on more elk kills than even he can remember and yet he said this tendency toward cows lingered on all through his outfitting career which ran until 1965. Hunters he took out would literally ride their horses past herds of a hundred bulls without shooting. They wouldn't shoot them because they didn't want to eat them. And they were hunting for meat. If a bull was shot, one of the key parts of field dressing was to chop off the antlers so they didn't hang up in the brush when the bull was dragged out. Those antlers were all left behind. After all, you already had the weight of the meat to pack out. Why bother adding the weight of the antlers?

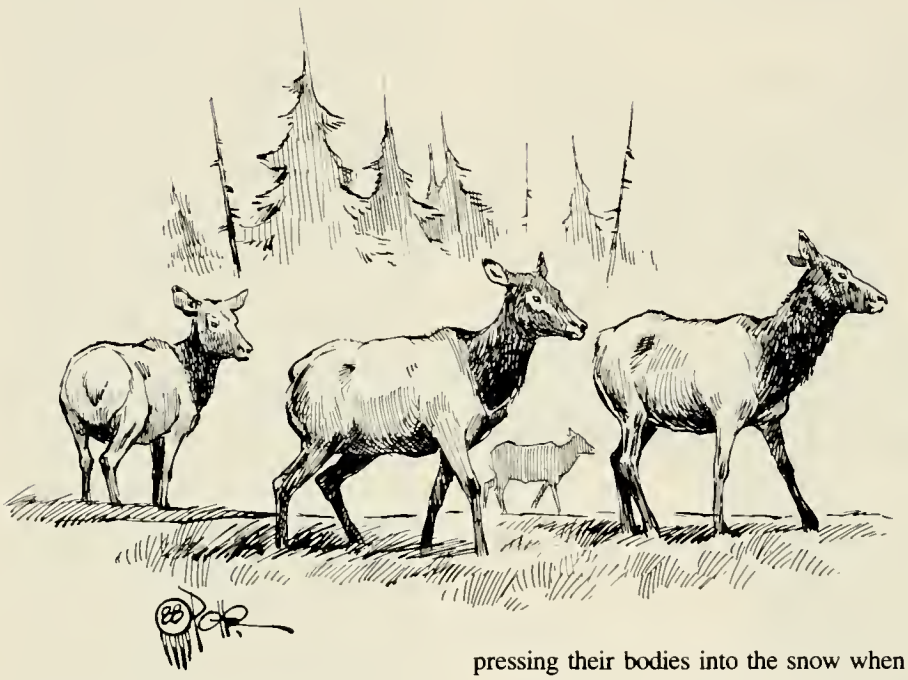
In his own mind, Hoppe is sure that countless record book elk were taken in that country without anyone ever knowing it. He can remember seeing many bulls with eight and nine points to a side that never had a rifle pointed in their direction. He can also remember a bull which was shot that had a spread of 64 1/4 inches which allowed four men to stand between the antlers to have their picture taken. The size of the antlers on those bulls was verifiable fact of their long lives. With no one shooting at them, their antlers grew to maximum maturity. One bull taken by a hunter near Gardiner in the late 1940s had been tagged at Jackson, Wyoming, some 28 years earlier.

Most hunters who sought these elk were simply laying in a supply of meat for the winter. For some rich eastern hunters, the sport involved bringing back a big set of antlers to hang over the fireplace. But they were the minority. And even some of these were more interested in the meat. All the locals and most of the regulars from outside the area were meat hunters, pure and simple. Their joy was in the pounds of venison they brought back home. The amount of sport involved in doing that was left up to the individual.

TO TRULY APPRECIATE THE SCENE that was going on every fall in elk country, you have to take a peek back in time to the way the tiny town of Gardiner was in those years. And believe me, in those years Gardiner was wild. In elk season, the bars never closed. Gambling casinos were wide-open. The hotels

were full. Hunters slept in every available corner of any room in any establishment that would tolerate them. A good deal of the restaurant fare was elk meat mixed with beef tallow. And, frankly, many hunters never made it out of town to where the elk were being hunted. They went home with elk shot by someone else.

In this day and age of more strait-laced accordance to hunting rules and ethics, the notion of drunken hunters burping up elk burgers and sleeping in the corner of a bar after they lost all their money gambling seems pretty wild. But, in truth it wasn't any wilder than the things going on out on the hunt.



The bulk of the elk hunting was done during the winter migration when deep snows forced the elk out of Yellowstone Park and headed them toward their wintering grounds farther north. When word spread that the migration was on, hunters would flock to the area by the hundreds, creating a firing-line situation almost as dangerous for the hunters as it was for the elk. During the late 1930s, '40s, and '50s, hunters would drive out from town, forming long lines of cars waiting for the 8 a.m. start when the gates would be opened to the hunting area. These lines of cars, most of them with their wheels chained, would snake up the trails toward the waiting elk. If one car got stuck, other hunters would lift it off the trail and set it in the deep snow so the rest of the cars could continue.

Once the elk were located, they would often be surrounded and the shooting would begin. With hunters on all sides, the elk would run one way, then another, and finally mill around out in the middle of the open valleys. Amid the hail of bullets flying in every direction, it's amazing that hunters weren't killed along with the elk. But, surprisingly, casualties of those firing-line years were rare, although more than a few survivors will still tell tales of hiding behind rocks or pressing their bodies into the snow when the bullets started whizzing past.

To give a little more depth to the scene, you should understand that not everyone on the firing line was a hunter. Some of them didn't even have guns. The old saying was that if you just showed up with your tag and a good pair of running shoes, you could get yourself a pretty good elk. In fact, a joke at the time was told about a fashion-conscious woman wearing a fur coat who stumbled and fell while running toward an elk and was tagged herself before she could get back on her feet.

The firing line led to some frightening slaughters. Hoppe recalls days when his hunters took 20, 30, and 40 elk. He remembers the day on Eagle Creek in 1946 when 1,280 elk were killed before noon. It was a time in elk hunting history when a man with a gun and elk out in front of him would keep firing until he ran out of cartridges and when you could take home an elk even if the extent of your hunting gear was a tag and a knife. In fact, you could tag an elk even if you never made it out of the bars or gambling casinos.

If all that sounds like bad sportsmanship on display, you have to remember that sport wasn't necessarily the all-important driving factor for these people. Elk were an animal to be harvested for their meat just like beef cattle, hogs, or sheep. It didn't matter so much how you gathered that meat, as long as you had the meat to take home when the hunt was over. The hunting trips themselves were supposed to be fun, so why not have your fun in town, and, if you could, leave the meat-gathering to your friends.

ALL THE COLORFUL PAST of elk country was just that, a colorful past, whether you're talking about the hunting at Gardiner, Montana, or Jackson, Wyoming, or the scattered other places where you could hunt elk a half-century and longer ago. It was as romantic as traveling by train from back East and as frightening as the firing line. But it didn't really have much to do with the fantasies of heading out in the old days with rifle in hand in search of big bulls. The assault on the big bulls came later. The drive to put your name in the record books with the really big bulls came much later.

In the old days, meat hunting was a way of life whether you were hunting elk in the Appalachians, central Canada, the upper Midwest, or the Rockies. It led to the demise of some elk populations and, in terms of today, an unsporting approach to the resource that remained in other parts of elk country.

It's true that these elk hunting trails were walked before. But it's a different kind of hunter who sets out on these trails today. And the type of hunter you are, want to become, or hope someday to be, is another consideration to be studied closely and carefully before you pick up your rifle and head out for elk.■

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• *This article was excerpted from "The Elk Hunter," a book by Don Laubach and Mark Henckel. It is scheduled for publication by E.L.K., Inc. in early 1989.*—Ed.

Teaching Kids To Hunt

continued from page 16

states require youngsters to pass before they can get their first hunting license are great, but they are only the beginning. The lessons learned there need to be continually reiterated and expanded upon.

Safety shouldn't be thought of as a separate component of hunting but should become an ingrained part of everything one does afield. Youngsters not only need to learn how to avoid accidents; they should also be taught what to do if one occurs. As a father, I often thought of the possibilities of my children being hurt while hunting, but I also realized that they were in more danger doing other things such as playing football or running around in automobiles. The truth is that most of the things that turn boys and girls into self-reliant adults involve some risk. Our responsibility is to teach them to recognize and avoid the hazards.

Personally, I feel that after safety, sportsmanship and outdoor ethics come next. Here it is well to remember that the most important lessons in life are caught, not taught. If you think, act, and talk like a real sportsman, your proteges will too. I don't like game hogs, I don't like litterbugs, and I don't like slobs who have no respect for other people's property or rights. I tried to teach my children to be none of these.

In the beginning when the kids stayed right with me, I used to have them flip a coin to see who shot first in case we saw game. It was certainly safer, and I believe they killed more game than if they had been competing with one another to see who got off the first shot. Once, Mark actually passed up a shot at a bull elk because it was Tim's turn to shoot. From his position, Tim couldn't see the bull, and Mark would have been completely justified in shooting, but he waited to give Tim a chance. The bull got away, but I was proud of Mark.

The anti-hunting element won't understand this, but the beginning hunter needs to be taught appreciation and respect for the animals he hunts and for the land on which they live. I don't believe a hunter has truly arrived until he can delight as much in the wise old buck that got away as he does in the one he shot. Hunting is much more than just killing game. It's a flock of geese winging its way through the early morning sky. It's the feeling you get when you've climbed to the pass just to see what's on the other side of the mountain and are rewarded with a vista of ridges, valleys, and peaks stretching as far as the eye can see. It's sitting in front of a lean-to listening to the fire crackle and watching the stars come out. It's these, and a thousand other things, that a kid will learn to love and appreciate if only given a little encouragement and half a chance.

Then there are the basic skills required by a good hunter, many of which can and should be taught long before a child is old enough to buy his or her first hunting license (12 is the minimum age in our state).

When son Mike killed his first deer with one shot, I wasn't at all surprised, and I don't think he was either. He had done a lot of shooting, first with an air rifle, then with a .22, and finally with his mother's Remington M600, .243 Win. Naturally, gun care went right along with learning to shoot.

All of the kids started hunting with Mom's rifle, even though Tim and Mark already had guns of their own, because it was light and the stock had been shortened. The little gun suffered much along the way. First, Tim tripped while crossing a dry creek bed and the gun went sailing through the air, crashing into a boulder. They all dropped it at least once, and I got kind of used to seeing it bounce down rock slides. For safety's sake, we never chambered a round until we actually saw game. Mary now has a new rifle, but the old one will always be a family treasure.

I encouraged the children to shoot only good-sized bucks. Not that I had anything against taking does, but it got them used to the idea of seeing game without feeling they had to kill it and, besides, if they had to take the time to judge an animal's trophy potential before they shot, they were less apt to make the sort of mistakes that come from haste.

One of the most important hunting skills is the ability to spot game, and to develop this ability we had a little game we used to play on outings or when driving across country. I'd pay the kids for spotting game, a nickel for deer and antelope (that was back before inflation), a dime for elk, a dollar for black bear and, to really make things interesting, $5 for a grizzly bear. They never did collect on the grizzly.

It was fun to watch the progress they made as hunters. At first they spotted very little game and I had to go slow so they could keep up. However, it wasn't long until they were carrying their share of the load in every respect and, before each boy was out of high school, the day invariably came when he could outhike me. None of them ever made a big deal out of it—they just waited for me as I had once waited for them.

Girls, of course, are different because they don't have a macho image to uphold, and I babied Colleen a little. I carried her rifle the day she killed her deer, a three-point mule deer buck which she dropped at about 150 yards with one shot. But even then, she climbed a mountain that many men would be proud to get up.

Again for safety's sake, woodsmanship is important. Each child should carry a survival kit with at least the following items: matches, fire starter, compass, an 8x10-foot sheet of thin plastic, and emergency rations.

At lunch break, have them start a small fire and, if they don't know how, teach them. Teach them to set up an emergency camp so they know what to do if lost. Don't take anything for granted. For instance, we had hunted deer in one large mountain valley for five years and I thought the boys knew it intimately (and they did) but I was amazed one day to find that Mark thought north was west. He'd have been in trouble if he had gotten lost, and his compass wouldn't have helped him. After that, I taught the kids how to use maps.

The benefits that a child derives from hunting reach far beyond the boundaries of the sport itself. Hunting is the best way I know to acquaint a youngster with the realities of life. The reason that there is so much anti-hunting sentiment

After safety, outdoor ethics and sportsmanship come next. Beginning hunters need to be taught appreciation and respect for the animals they hunt and for the land on which these animals depend.

today is that people live in a sort of plastic world. They eat meat, but have never seen an animal die; they drink milk, but have never seen it come from a cow. Their concepts of the natural world come from watching TV. Children need to learn that in order to live on this planet man must be both a predator and a conservationist, both a user and a protector of our natural resource.

Hunting also teaches self-reliance and cautious courage. For the first couple of hunting seasons, I'd keep the youngster with me all the time, and then gradually let them venture off on their own. At first, it was little things like having them go up one side of a draw while I went up the other but, eventually, as they matured, I felt completely confident in letting them go alone.

A major problem of our society is that families do so few things together, either in the areas of work or recreation. The average youngster today has never seen his parents at work earning a living, much less had a part of it. Good recreation programs are provided by schools and civic groups, but they have a tendency to separate rather than unite the family.

I was fortunate to be raised on a farm back when life was a lot simpler. Every member of our family worked and, when we played, we often played together. My children were raised in town (as most are today), but I believe hunting provided something of what they missed in both areas. It was top-quality recreation, but hunting also contributed to our livelihood in that it put a lot of meat on our table. A common question at our house when venison was served was, "Whose deer is this?" A child has a right to be proud when it's his deer that is feeding the family.

I haven't meant to imply that hunting is all that's needed to turn children into responsible citizens. But I do believe it helps, and the best part is that it's fun for everyone concerned.

Teaching a kid to hunt takes a lot of time and patience, and it certainly isn't recommended for the selfish because you pass up a lot of opportunities to get game yourself but, on the other hand, it's hard to imagine anything more gratifying. You don't have a child to teach? Nonsense, with all the single parent homes that we have in America today, it's heartbreaking to think of all the kids who will never have anyone to take them hunting.

I have fondly imagined that someday when my children gather to scatter my ashes—at a place that I have chosen in a remote alpine meadow high on the Continental Divide in Montana—that, after the sad deed is done, they might sit for awhile, there among the wildflowers and the bighorn sheep, and reminisce about the fun things we did together. And, no doubt, hunting experiences will be among the cherished recollections. In other words, my intention has been to leave them the kinds of memories my father had given me.

Perhaps something of that sort will happen yet, but I've recently learned that in this cockeyed world things sometimes get turned upside down, and around, and happen in reverse.

On March 23, 1986, we lost our oldest son Timothy in a boating accident off the coast of Kodiak Island in Alaska. It's not supposed to be that way—parents are supposed to die before their children. But, once again, I find that I'm the one who is left hanging onto memories. I'm glad I took him hunting.

* * * * *

• *Bill McRae's article is reprinted from the July/August 1987 issue of* Buckmaster Whitetail Magazine.—Ed. ■

READERS RESPOND

He Earned a Mountain

You sure know how to send chills up the spine (" 'Hobnail' Tom," July/August 1988). As a student of Tom's (Helena High School, '54), he probably is the most remembered teacher in all my years. He taught art with a passion, but more than that, he taught passion and goodness. It may have taken a few years of growing up to know just how much he did teach, but then the richness and how well he did it will never be forgotten.

Like the winter Mondays when we'd all go out and look at the bed of his old pickup and view the weekend's catch (lions).

The cold fall weekends when he'd let us camp and hunt from a pine stand west of the main house.

His energy to say do it again. Do it again, and you loved every minute of it.

After many years, I finally got back to the Whitetail—two years too late—to say thanks. I'm glad there's a trail named for him, but he earned a mountain.—*Paul W. Hodges; Southampton, New York*

Rivers Series Ignored

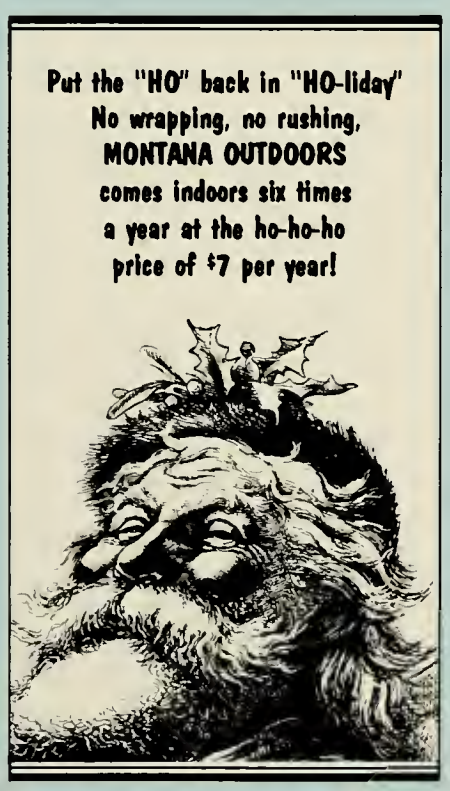
Streamside Subdivisions

The Montana Land Reliance commends the project team of the Montana Rivers Study (which *Montana Outdoors* featured in the two-part article, "Here's to the Rivers!" in May/June and July/August 1988) for its documentation of the resource values of Montana's rivers. Hopefully, the study will inform future development projects in the river basins, and if adverse development occurs, ignorance of potential impacts to natural resource values will not be a valid excuse.

"Here's to the Rivers!" mentions ongoing threats to the rivers and their tributaries from irrigation dewatering, logging, mining, municipal and industrial sewage, and dam construction. Unfortunately, there was no mention of a particularly significant threat—residential subdivision in the riparian zone. For the past decade, the Montana Land Reliance, a private, tax-exempt land trust based in Helena, has helped to stem this threat by working cooperatively with private landowners.

Residential development on river and stream banks degrades the riparian zone. Streamside vegetation is lost and water quality deteriorates. When water quality declines, our taxes increase to meet the resulting demand for water treatment plants. Without streamside vegetation to sponge ground water and modulate its discharge, we all suffer the economic damage of the floods and droughts that result. Declining fish and game populations that depend on riparian areas will hurt Montana's tourist industry as well as our own outdoor recreation.

The current severe drought dramatically illustrates how much we stand to lose when our freshwater resources dry up or are otherwise abused. Westerners have always demanded a good deal from their streams and rivers. Many demands are being met at the expense of the ecological underpinnings of the hydrologic system. Ironically, the enjoyment of free-flowing water has created a tremendous market for riverside subdivision. As these subdivisions inexorably proliferate, they preclude the enjoyment of healthy riparian systems that lured people to 20-acre homesites in the first place. It is past time that we give something back to the rivers. We need to be better stewards of the riparian area.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Since much of the land along our popular recreational rivers, especially in southwestern Montana, is privately owned, it is private landowners who hold the key to conserving the variety of benefits flowing from our rivers and streams and enjoyed by the public. Knocking on doors up and down the river valleys, the Montana Land Reliance seeks out sympathetic ranchers who are willing to donate their non-agricultural development rights through a Deed of Conservation Easement that will insure that their property is never developed into residential areas.

Landowners release their development rights to the Reliance, having decided that it is best never to develop the property for non-agricultural purposes. In return, because their action is recognized to be in the public interest, they may be entitled to a charitable donation at tax time. These gifts of conservation easements permanently preserve the public benefits of open space and fish and wildlife habitat.

It is important that those interested in the conservation status of Montana's rivers be aware of the Reliance's effort to protect Montana's rivers and their tributaries from residential development. To date, the Reliance has received 21 conservation easements over more than 54,000 acres of ecologically significant agricultural ground. Together, these easements prohibit residential subdivision on nearly 30 miles of bank along Montana's major rivers and nearly 68 miles of tributary stream banks. By 1989, the Reliance expects to receive an additional three conservation easements, one of which will protect almost half of the east bank and riparian area of the blue ribbon stretch of the Missouri River between the Wolf Creek and Craig bridges.

Should the readers of *Montana Outdoors* desire further information on the Montana Land Reliance, we hope they will write us at P.O. Box 355; Helena, MT 59624.—*Jan Konigsberg, lands director, Montana Land Reliance, Helena*

MONTANA OUTDOORS INDEX

The major items published in *Montana Outdoors* in 1988 are indexed below. Extra copies of all '88 issues are available at $2 each (includes postage). The following back issues are available at the same price:

1971—May/June, July/August, Sept./Oct.

1972—July/August, Sept./Oct., Nov./Dec.

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1975—all issues, except Sept./Oct.

1976—all issues, except Jan./Feb.

1977—all issues, including Yellowstone Special Issue

1978—all issues, except May/June

1979—all issues

1980—Special Hunting Issue, March/April, May/June, Sept./Oct., Nov./Dec.

1981—all issues

1982—all issues, except May/June and Nov./Dec.

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1985—all issues, except March/April

1986, 1987—all issues

To inquire about or order a back issue write: Back Issues, *Montana Outdoors*, Department of Fish, Wildlife and Parks, 930 Custer Avenue West; Helena, MT 59620.

BOOKS REVIEWED

A Wilderness Original: The Life of Bob Marshall—by James M. Glover (March/April).

Arctic Dreams—Imagination and Desire in a Northern Landscape—by Barry Holstun Lopez (March/April).

Navigations—by Ted Kerasote (May/June).

Montana on My Mind—by Michael S. Sample and Larry Mayer (May/June).

M Is for Montana—by Gayle Corbett Shirley, illustrated by Constance Rummel Bergum (Sept./Oct.).

Bud Lilly's Guide to Western Fly Fishing—by Bud Lilly and Paul Schullery, illustrated by Lee Stroncek (Sept./Oct.).

Truth, Lies & Otherwise—by Carl "Skinny" Rowland (Sept./Oct.).

Montana Spaces—edited by William Kittredge, photographs by John Smart (Nov./Dec.).

FISH/FISHING/WATER

Love Those Anglers!—An angler preference survey proves that Montana anglers have a lot in common with die-hard baseball fans (Tom Palmer, March/April).

Perspectives—"The Mind of the Fisherman"—The "process of fishing" begins with leaving work for a different world (John Seidensticker, illustrated by Shirley Cleary, March/April).

The New Rainbows—New strains of rainbow trout have been introduced in some cold-water lakes and reservoirs where they were not previously found (Dick Vincent, May/June).

The "Reeeeallly" Big Ones—The 1987 list of Montana's record fish (May/June).

Here's to the Rivers!—A two-part, drainage-by-drainage assessment of the natural resource values of Montana's streams and rivers (edited by Sally Hilander, May/June, July August).

Festival!—The life, transformation, death, and rebirth of the salmonfly is an annual festival of beauty and expectation (Ron Marcoux, July/August).

The Worth of Fishing—Montana's lakes, reservoirs, streams, and countless small tributaries are special places to those who know and fish them. But how much are these experiences worth—in cold cash? (John Duffield, Nov./Dec.).

GAME/HUNTING

Springtime Blues—Blue grouse in spring are a far cry from the somber, bluish-gray birds you see during mountain treks in summer and fall (Bob Martinka, March/April).

A Shot for Waterfowl—"Shooting Steel Shot" by Jeff Herbert, and "Reloading Steel Shot" by Tom Hinz (July/August).

Landowners and Sportsmen: Toward a Partnership—By establishing landowner/sportsman committees, a hunter management program, walk-in-only areas, and other programs, the Department of Fish, Wildlife and Parks has helped to improve relations between landowners and recreationists (Rich Clough, illustrated by Lavon Horne, July/August).

Cheating Lady Luck—A bid of $7,250 won Montana's first-of-state moose auction license. The Catchall (Mark Bennett, July/August).

Britts & Huns—The news that Brittany spaniels and Hungarian partridge were made for each other is one of the West's best kept secrets (story and photos by Dave Books, Sept./Oct.).

How're the Deer Doin'?—Except for mule deer in the mountains, deer populations in south-central Montana have increased in recent years (by Charles Eustace, Sept./Oct.).

Perspectives—"Courtesy is the Key"—No hunter who asked permission and was courteous was turned down (Warren Wintrode, illustrated by Diane Nugent, Sept./Oct.).

A New Season for the Elkhorns—New hunting regulations in the Elkhorns are designed to increase the number of older bulls in the elk population (Rich DeSimone, illustrated by Robert Neaves, Sept./Oct.).

Best of the Big Medicine—The chance to enjoy the solitude of the outdoors is among the strongest motivating forces for Montana's elk hunters (Tom Palmer, Sept./Oct.).

Bowhunter Education in Montana—Montana is one of the few states requiring bowhunter education. The Catchall (Tim Pool, Sept./Oct.).

Pesticide Warning—It's Gone—The warning about possible pesticide contamination in upland game birds will be removed. The Catchall (Sept./Oct.).

Teaching Kids to Hunt—Teaching a kid to hunt takes a lot of time and patience, but it's hard to imagine anything more gratifying (story and photos by Bill McRae, Nov./Dec.).

These Trails Were Walked Before—To truly appreciate the scene every fall in elk country, take a peek back in time to the tiny town of Gardiner (Don Laubach and Mark Henckel, illustrated by John Potter, Nov./Dec.).

Perspectives—"Cold Snap"—Dawn of the deer season opener came at about 15 degrees on the first of several Arctic cold fronts and a 35-mile-per-hour wind (Larry Holland, illustrated by Randy Bishop).

"Most Improved": Montana's Hunter Education Program—The National Rifle Association named Montana's program the "most improved" in the nation for its 1987 activities. The Catchall (Nov./Dec.).

GENERAL

Special Photo Issue—(Jan./Feb.).

Learning About the Outdoors IN the Outdoors—Ecological concepts come alive when the "classroom" is Glacier National Park (Ursula Mattson, March/April).

Samuelson's Mallards Win '88 Stamp Contest—"Rite of Spring" wins for Missoula artist Dave Samuelson (Bill Phippen, March/April).

Shikar-Safari Honors Two Wardens—Gary Benson and Jim Kropp received prestigious Shikar-Safari Club "Wildlife Officer of the Year" awards. The Catchall (March/April).

Wild Horse Island: Recommitment to Preservation—Under a preservation management philosophy, Wild Horse Island's natural qualities will be conserved (Terry Knupp, May/June).

Perspectives—"The Antler Tree"—A poetic trek for shed antlers comes back "distinct as moon" (Paul Zarzyski, illustrated by Mike Hollern, May/June).

The Nature Conservancy: Data, Dollars, and a Deed—Environmental gloom and doom sermons are unpalatable, so The Nature Conservancy takes direct action in the marketplace to save habitat (Bob Kiesling, May/June).

Remembering Arnie Foss—A memorial tribute to the department's wildlife manager in Bozeman. The Catchall (May/June).

The Wildlife Society Honors Mitchell—Jim Mitchell, wildlife manager in the Great Falls region, was presented with the "Distinguished Service Award" by the Montana Chapter of The Wildlife Society. The Catchall (May/June).

Nick Kramis—Wildlife's Friend—Fish and wildlife in Montana's Bitterroot Valley lost a champion when Nick Kramis died. The Catchall (Bill Thomas, May/June).

Perspectives—"Sounds"—The sounds of a Southeast Kansas boyhood are different from those recognized by boys growing up in Montana (story and photos by Mike Logan, July/August).

"Hobnail" Tom—Tom Edwards began packing dudes and their gear into the Lincoln backcountry in 1947 (Michael Korn, July/August).

Bronzes Help Heritage Park—Sale of miniature bronzes will enable acquisition of land near Giant Springs Heritage State Park in Great Falls. The Catchall (Bert Lindler, July/August).

WILD and Growing—Project WILD has taken off nationally and in Montana (Cheryl Charles, Sept./Oct.).

WILDLIFE

Nongame News

March/April—bald eagles, marked birds, nongame checkoff.

May/June—nongame symposium.

July/August—Montana Loon Society formed, "Big Day" bird sightings.

Sept./Oct.—updates on LeConte's sparrows, harlequin ducks, and bluebirds; kids for wildlife; ferrets in Alberta; birding hotline.

Nov./Dec.—Christmas Bird Count, national nongame checkoff totals.

Prairie 'Cat—Many people are surprised to learn that the bobcat thrives on the eastern Montana prairie (Brian Giddings, March/April).

Montana's Rare Ones—An in-depth, comprehensive, up-to-date look at the eight animals classified as "endangered" or "threatened" in Montana (Mike Aderhold, illustrated by Diana Haker, March/April).

Whiskey Jack —The gray jay is a bold, brazen mooch of a bird, thus earning its nickname (Bill Ciesla, March/April).

Life on the Edge—Mountain goat country is often perceived as the last vestige of an unexplored, undeveloped frontier, but it is not as remote and inaccessible as it once was (Gayle Joslin, May/June).

Part of the Natural World—Nongame wildlife contributes to the quality of life cherished by Montanans and visitors to the state (Dennis Flath, illustrated by Diana Haker, May/June).

Lee Metcalf National Wildlife Refuge: A Sight Worth Seeing—The refuge offers 2,700 acres of habitat for waterfowl and other wildlife (Susan and Richard Harness, May/June).

Habitat for the Future—Passage of a hallmark bill by the 1987 Montana Legislature translates into habitat for elk, deer, bighorn sheep, and many other wildlife species (Bill Phippen, illustrated by Robert Spannring, July/August).

Muskrat for Mascot—When it comes to coping with natural and manmade changes in its environment, the muskrat is an all-star (Mark Bennett, July/August).

Montana Mountain Goats—A pullout pamphlet that provides an identification checklist for mountain goats (Gayle Joslin, Sept./Oct.).

I'll Take the Prairie—The prairie is straightforward and honest—you always know where you are and how you stand in relation to everything else (Gary Turbak, Nov./Dec.).

What Bears Take for Granted—That bears can subsist for six months during the coldest of weather without eating, and at the same time give birth and rear young, is no less than a scientific marvel (Tim Thier, Nov./Dec.).

Montana Mountain Lions—This pullout pamphlet provides tips on sex and age identification in the field (Gayle Joslin, Nov./Dec.).

State Purchases Robb Creek Site—A 33,000-acre wildlife management area forms a critical link in one of Montana's finest elk ranges. The Catchall (Nov./Dec.).

Living With Hunter Orange—Wearing blaze orange can be a lifesaver, even for bird hunters. The Catchall (Bill Phippen, Nov./Dec.).

Clutter Got You Behind the Old Eight Ball???

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One binder holds six issues. To order yours, send $6 (includes postage) to: MONTANA OUTDOORS, Department of Fish, Wildlife and Parks, 930 Custer Avenue West; Helena, MT 59620.

NONGAME NEWS

CHRISTMAS COUNTS COMING

Birders throughout Montana will again join forces in December and early January for the Christmas Bird Count (CBC). The annual event is sponsored by the National Audubon Society. This survey is the largest single effort by the nation's amateur bird-watchers and it offers a chance to gain important information about the abundance and distribution of winter birds throughout the country. Montana's counts have been a primary source for winter distribution maps in "Montana Bird Distribution."

In 1987, from Fort Peck to Troy, almost 500 observers conducted 23 counts across Montana. Species counts ranged from a low of 26 at Clark Canyon Reservoir, to a high of 80 species at Bigfork. In Hamilton's first count, 29 observers recorded 60 species. A total of 478 counts have now been conducted in Montana over 74 years. Three new species were seen last year: a Ross' goose at Great Falls, a white-winged scoter at Helena, and a Thayer's gull at Fort Peck, bringing the total to 186 species sighted on Montana CBCs.

What effect has the drought had on bird populations across the state? How about the fires in and near the count areas in Yellowstone and Glacier National parks? These are just two of the questions that will be on observers' minds as they begin their Christmas counts this year. If you would like to participate, contact your local (or nearest) Audubon Society Chapter for details.

CHECKOFF TOTAL HITS EIGHT DIGITS

Concerned citizens contributed over $10,000,000—*ten million dollars*—to nongame checkoffs across the nation in 1987. Thirty-four states have checkoffs on their tax forms, with Mississippi and Vermont the latest to develop this source of funds. Donation rates (% of taxpayers) continued to be lower in states with competing checkoffs and states where all taxpayers are eligible (such as Montana). Both donation rate and overall average donation increased nationwide over 1986 figures.

Contributing Montanans continued to give at a rate competitive with other states, with the ninth highest average donation ($7.94). However, Montana ranked 33rd (second to last) in percent of citizens participating—less than 1% of the eligible taxpayers contributed, with total income amounting to just 7 cents per eligible taxpayer.

The tax checkoff and direct donations continue to be the primary source of funds for the Montana Nongame Wildlife Program. As the year comes to a close, consider contributing to the checkoff on your 1988 Montana income tax form.

Cold Snap

continued from page 36

patches in the thicket, look away, look back to see if all was still in the same place. I had done that for maybe 10 minutes when I looked back and counted eight new trunks. I am continually delighted by such magic.

Above those eight new trunks materialized two whitetail heads. Neither had antlers. They'd nuzzle the ground, then lift their noses slightly, then lift their heads straight up, as if pulled by scent they knew was there but hadn't caught yet. The two does had been 20 yards in the thicket when I first saw them; now they were poking near the clearing. The woods seemed to have gone quiet—I had shut out everything but the deer. I turned the woods back on—it was still there, leaves, trees, geese, and all.

The does would come into the clearing and track west. That would put them broadside at 80 yards behind a cedar. That's when my hands would come from my pockets, the left would lift the rifle by the forearm and let the sling drop and hook just above the left elbow, and swing the stock around into the right. There'd be enough time to bring it up, for the eye to pick up the cedar in the scope, and watch the first doe walk into the cross hairs.

The recoil bumped the gun, the eye lost sight of the doe for the instant a charge of powder takes to explode in a chamber and push 19 grains of jacketed lead across 80 yards of clearing. Her flag zigzagged south into the thicket and disappeared. Then there was the quiet that comes when what you're listening hard to all at once isn't there. I looked at the sky. The geese were still at it. Near the thicket one set of tracks of a deer running east were dark silent holes in the snow.

A deer down in the woods means powerful good eating as well as some careful knife-work and sorting. The work started where the deer fell, in a thicket under an ash tree. It would end with the deer in the back of the pickup. The snow would give a big assist to the whole business.

SNOW WILL CLEAN hands and arms of blood, but won't cut coagulated fat. I shook my somewhat clean hands and stood still in the darkening woods. Mixed with the goose chorus on the wind was the early yapping of a coyote, trying to interest some pals in going out to eat. Not yet dry but getting cold, my hands kept me from admiring too long dark coming on the thicket.

I tied the front feet up behind the ears and made a rope harness to go across my chest. With the rifle in one hand and the sack in the other, I leaned into a 3/4-mile drag three inches of snow would smooth except for the last 50 yards up the bank. The hard part of hunting alone is putting something dead and big in a pickup box. Good rope and eyebolts near the tailgate make a primitive winch that, lubricated with enough sweat, works.

I sat on the tailgate in the dark, let the sweat dry on my back, finished off the coffee. At home, I'd clean the liver and heart and slice them. This week we'd eat liver and onions, baked heart and dressing. I swirled the last of the coffee in the cup and out onto the snow. It made dark holes like black stars splashed on a white heaven. I looked up one last time to hear geese flying along the Milky Way, feathered stars stitching a universe together.

In the cab I turned the key, let the engine idle a couple of minutes, and turned on the headlights. Down the fence line the high beam reflected doe eyes like two stars low above the hay field. I put in the Waylon Jennings tape and said to her, Waylon, and me, "There ain't another way to be."■

JOHN DUFFIELD

The Worth of Fishing

by John Duffield

Maybe you can remember your trip to the Madison River last summer. Or maybe you missed out and will just have to imagine it. The weather was great: beautiful sunny days with afternoon thunderstorms making the valley and the towering Madison Range all the more spectacular. If you went during the salmonfly hatch, you probably spent each day marveling at what the presence of multitudes of very large floating meals do to the judgment of very large and otherwise well-educated browns and rainbows. In the evening as the wind died down (and even though your right shoulder was getting a little sore), you walked down from camp for just a few more casts. You discovered it was happening all over again: a thick cloud of caddis serving up the evening meal. That's when you turned to your partner and said, "It just doesn't get any better."

countless small tributaries that are all special places to the people who know and fish them. Have you ever wondered what these experiences are worth to people—in cold cash? For some, to think of trying to quantify the value of an angling experience is profaning the sacred. Many of us, whether we have had the good fortune to grow up fishing Montana waters or not, can relate to the opening line in Norman Maclean's book, "A River Runs Through It": "In our family, there was no clear line between religion and flyfishing." For some families, the religion centers on lake fishing for lunker bull trout or wily walleyes; for others, it's the rituals of ice fishing.

SO, THERE ARE MANY SIDES to the fishing experience, and Montanans hold strong feelings about their sport. But why would anyone ever want to know what these special times are worth? The quick answer is that, for better or worse, land uses that compete with fisheries and wildlife resources *do* have obvious dollar values. An example familiar to Montanans is the Kootenai Falls hydroelectric project proposed in the late 1970s. The dam would have diminished the popular China Rapids fishery and altered the scenic character of the falls. To determine if Montana was better off with or without the dam, economists needed to compare the value of the recreation experiences that would be changed or lost with the dollar value of the electricity that could be produced and sold on the market.

There is a less dramatic, but equally important, justification for putting values on fish and wildlife resources. Just as with any productive asset (such as timber or agricultural land), wise management requires knowing the relative benefits and costs of alternatives. For example, in deciding on an investment in a trout hatchery for stocking a given lake, it would certainly be useful to know the value of the improved fishery. This could help hatchery managers decide if the hatchery project should be undertaken and, if so, at what level. Because of these concerns, and also out of a desire to establish benchmark data to evaluate changes over time, the Department of Fish, Wildlife and Parks (DFWP) in 1985 initiated a comprehensive evaluation of

JOHN DUFFIELD

Have you ever wondered what a day of fishing or hunting in the "Big Sky Country" is worth? Department of Fish, Wildlife and Parks administrators did, and in 1985 they initiated the Montana Bioeconomics Project to find out.

the fishery and wildlife resources under its jurisdiction. The Montana Bioeconomics Project was primarily the brainchild of Pat Graham, administrator of the department's Fisheries Division, and Arnold Olsen, administrator of the department's Wildlife Division. They recognized that fish and game agencies in other states were beginning to benefit from recent advances in the economics of outdoor recreation.

The study was conducted in two phases. The first year focused on constructing statewide economic models of cold-water lake and stream fishing and deer, elk, and antelope hunting. Basic objectives were to collect and evaluate information on fishing and hunting expenditures and to estimate the economic value of the associated experience. The second year focused on just two resources: Montana's blue ribbon trout streams and the state's most productive elk hunting districts. The second-year projects were dubbed the "angler preference" and "elk preference" studies, since the focus was not only on economic values but also on identifying angler and hunter preferences for different types of experiences and for specific management alternatives on particular sites. The study team included a social psychologist, Stewart Allen at the University of Idaho; and three economists, Rob Brooks at DFWP, John Loomis at the University of California at Davis, and myself at the University of Montana. The goal in writing this article was to provide a general understanding of the methods used in conducting the research and a summary of findings. This article will report on the fisheries studies, and a later article will address the hunting studies.

What were the basic findings with respect to fisheries? First of all, we found that the average day of stream fishing in Montana is worth about $100 and the average day of lake fishing $70. Based on total fishing pressure of 2.5 million days per year, the annual value of Montana's lake and stream fisheries totals $215 million. In the same way that the price of farmland is related to the value of production, the recreational value of Montana's "fishing assets" is on the order of $5 billion. Having just read that the average day of fishing in Montana is worth $70 to $100, some basic questions should be racing through your head. How were these estimates made? What exactly do they measure? Let's take a brief look at each of these questions.

BEGINNING WITH THE FIRST question, what is being measured when we say that a day of fishing is worth $100? In a market economy, the worth of a given commodity is measured by what individuals are willing to pay for it. For marketed goods, the "exchange value" of a commodity or service is given by the market price. There is not now (and probably never will be) much of a fee fishery in Montana. In many European countries, however, fishing rights are owned by the adjacent landowner. Several years ago, I had the opportunity to work in Norway and visit a famous Atlantic salmon river (the Laerdahl) in the valley where my grandmother had been raised. The river turned out to be very expensive. As one can read in "Angling in Norway," published in 1981: "Daily fishing per rod may be well above kr. 1,000 [$200] per day. These are the prices one must be prepared to pay in the best season...in the Laerdahl...and other waters." While fishing on some rivers is less expensive, others are unavailable at any price because of long-term leases by wealthy individuals and corporations. (The author ended up paying about $15 to fish part of a day on a relatively unknown river near Trondheim.)

One can argue about how trout fishing on Montana's blue ribbon streams compares to Atlantic salmon fishing in Norway. Our basic point is that fishery resources are valuable and, where people have no choice, they will pay for the right to fish. The general range of bona fide market prices in Norway is roughly similar to the average $70 to $100 value we have stated for Montana. In fact, market prices in Norway are not strictly comparable to what we measure with an average value of $100 per day in Montana. To understand this, one needs to realize that a market price is really the *minimum* value associated with a given quantity of use. For example, think of the price people pay for permits to hunt bighorn sheep in Montana. If you are lucky enough to draw one, the permits sell for $52 or $322, depending on if you are a Montana resident or not. We know, since people pay these amounts, that the permits and the associated hunting experience are worth *at least* $52. But some hunters would pay a great deal more for a permit. This year the North American Foundation for Wild Sheep auctioned the right to hunt one trophy Montana ram for $109,000. Similarly, people pay a $5 entrance fee to visit Glacier National Park, but (if forced to) at least some individuals would pay a great deal more.

To estimate the *true* value of a given resource, one needs to know the price that each individual would pay before choosing to do without the resource. The total value of a bighorn sheep permit is $109,000 (for at least one person), perhaps nothing for others, about $52 for others, with many values in between. In fact, these values can be read directly from what economists call a "demand curve," which relates market price and quantity at all possible prices. Stated simply, the "law of demand" results in less of a given product being sold as the price goes up. For example, when a shoe store has a sale, the managers know that the law of demand will result in increased sales. In summary, estimating the total value of a resource requires an estimate of its market demand curve. Average value is then the total value divided by the quantity used or sold, and in this sense, the average value is like an average market price.

MONTANA IS NOT NORWAY. We do not have to fork over $100 or more every time we fish our favorite water. For this, many of us who love to fish and hunt are eternally grateful. In the meantime, though, it makes the economist's job of valuing Montana's recreational opportunities a lot tougher. Given that we want to estimate demand, how do we go about it in the absence of extensive market information? There are basically two approaches. The first method is the so-called travel cost method. It was suggested by a Harvard economist, Harold Hotelling, in 1947. In a letter to the director of the National Park Service, he suggested that the way in which the number of visits to a given recreation area declines with the cost of travel could be used to estimate a demand curve. For example, if one drew

(on a map) concentric circles around a recreation site, for example, Glacier National Park, and compared the per capita visits and travel costs from nearby areas (such as Kalispell) with the visits and costs from more distant areas (Spokane, Billings, Minneapolis, etc.), it appears that travel cost and distance act like a price that varies over space. If we assume that individuals will react to a site or permit fee the same way they do with increases in travel cost, it is possible to estimate a demand curve. Since Hotelling's initial idea, many improvements have been made to his method.

The other approach to valuing recreational sites also had its origins at Harvard. Robert K. Davis used what is now called the direct survey method to place a recreational value on Baxter State Park in Maine. The basic idea of this method is quite simple: If you want to know what people are willing to pay for something, ask them. For example, Davis asked recreationists how high an entry fee they would be willing to pay before they would discontinue visiting the state park. As one might suspect, the method requires carefully worded, realistic, and understandable questions. There are several ways to vary the question format. One approach is to give individuals a fixed dollar amount and let them merely respond "yes" (I would pay that amount) or "no" (I would not pay that amount). The fixed dollar amount is then varied across individuals (say from $1 to $500) and a demand curve is statistically estimated from the proportion of yes/no responses at each dollar level.

Both the travel cost and direct survey methods were used to value stream fisheries in the Montana Bioeconomics Project. The travel cost model was based on two surveys of anglers holding Montana licenses in 1985, a brief mail survey that sampled 19,271 anglers, and an in-depth phone survey of 1,491 of these anglers. The stream travel cost model was applied to 49 specific rivers, tributaries, or river sections, and the lake model to 28 bodies of water. The direct survey method, which employed a mail survey of 2,171 licensed resident and non-resident anglers, focused on 21 major trout streams in the state.

Both survey methods found an overall average value per fishing day for streams of about $100. These values ranged from a low of about $37 for the Kootenai River to a high of about $160 for the Madison. These differences are related to the type of angler attracted to the different rivers. For example, for the state as a whole, one-fifth of the total stream fishing use is by non-residents. The surveys showed that the average non-resident stream angler in 1985 spent $536 and traveled 1,521 round-trip miles to fish in Montana. In contrast, the average resident angler spent only $36 per trip, and fished a river within 60 miles of home. While the proportion of non-resident use on many rivers, such as the Kootenai, is around the statewide average of 20%, on the Madison, 67% of the use is by non-residents. The fact that many non-residents who fish in Montana are fairly well-heeled, dedicated anglers may explain in part why the value for the Madison ($160) is high. Many Montanans may not realize that this state is widely regarded as one of the premier wild trout fisheries in North America. Non-resident use of some Montana rivers, such as the Madison, indicates they are "destination" fisheries, in the same sense in which we think of major "destination" ski resorts. Needless to say, this summary necessarily omits considerable detail; interested readers can obtain complete reports from DFWP headquarters, 1420 East Sixth; Helena, Montana 59620.

FOR THOSE OF YOU who have made it this far, the next and last question may be the most important: How do we know these estimates have any validity? Not surprisingly, the study has generated at least one letter to the editor suggesting that the $100 per day value for fishing is a "phantom recreation value." The "phantom" label seems to come from the idea that if we do not pay hard cash for an experience, then it cannot have a true dollar value. The latter line of reasoning would imply that if we had to pay $150 for a seat at the Super Bowl, then it is worth $150; but if we got in free, the seat is worthless.

By validity, we mean consistency of travel cost or direct survey model estimates with the values or prices that we would observe if actual recreation markets existed, as they do in Norway. One approach is to look for consistency across the different methods. As noted above, the overall average estimates from the travel cost and direct survey approaches were similar. Values were also similar on a site-specific level—for example, the estimates for fishing the Missouri River (Holter Reservoir to Cascade stretch) were $50 and $53 per day for the travel cost and direct survey methods, respectively. On the Madison, the respective values were $161 and $157 per day. At other sites (particularly those with a relatively small number of anglers surveyed), the values diverged somewhat more. However, the overall statistical correlation across sites for the two methods was very high. Given that the methods are extremely different and based on very different survey data, this consistency lends credibility to the estimated values.

Another way to validate the methods is to compare actual cash transactions in similar situations. In a now-famous 1978 study, Richard Bishop and Thomas Heberlein at the University of Wisconsin compared how goose hunters responded to hypothetical survey questions versus actual cash offers. Specifically, hunters who had drawn a special one-day permit to hunt at a wildlife refuge were asked hypothetically if they would sell their permits for various dollar amounts, ranging from $1 up to $200. A separate sample of hunters was actually mailed valid checks in dollar amounts—again ranging from $1 to $200—and had the option of keeping the permit or mailing in the permit and cashing the check. The response rates were fairly similar; the hypothetical value was $101, while the cold-cash value was $63. More recent studies of deer hunters by the same authors have shown similar agreement between cash and hypothetical values.

Our general conclusion is that the methods we used in valuing Montana's outdoor recreation resources appear to be valid for resource allocation and management purposes.

• *Part Two of this article, which will address the dollar values residents and non-residents place on hunting opportunities, will appear in the March/April 1989 issue.*—Ed.■

CHARLES B. PLACE III

A team of researchers collected data on fishing expenditures and estimated the economic value of the fishing experience. They found that the average day of stream fishing in Montana is worth about $100, and the average day of lake fishing is worth close to $70. On an annual basis, the value of Montana's lake and stream fisheries totals $215 million.

Cold Snap

by Larry Holland
illustrated by Randy Bishop

October had been the ultimate fall—cold nights, still mornings, days turning to shirt-sleeve weather. The trees had taken to their colors as if the season intended to stay that way. It did, through the first three weeks of October. During the last night before deer season, the wind shifted to the north.

Dawn came at about 15 degrees on the first of the Arctic cold fronts and a 35 mile-per-hour wind. Snow swirled in gray woods. Rafts of geese were riding the wind out of Canada. I had been in my tree stand nearly an hour already, marveling at the metabolism and hollow feathers that keep fowl from freezing in that wind and at the power of hot coffee to keep my teeth from shaking loose from my jaw. I remembered stories of north country trappers playing games with themselves to keep from going to sleep—legend has it that anyone who goes to sleep in the cold freezes to death. I'd not heard of a white-tailed deer hunter ever freezing to death in his stand. Not wanting to be first, I climbed down twice to shake and stamp off the shakes.

By midday, the coffee was gone. The geese were still coming, the gray sky filled with the continuous cacophony that would keep up night and day for most of a week. The goose season would be one of the memorable ones—even the old hunters would not be able to recall such numbers nor better shooting. On my way back to town, I passed fields crowded with Canadas refueling on wheat. The open winter would keep them around for the easy picking. They looked like easy picking for a sneak now; but I was a deer hunter on a mission—my thermos was empty.

At home I had hot soup and sandwiches, made a pot of coffee, and thought how it would be a whole lot warmer to sit out the afternoon watching football on TV. By 3 o'clock, the snow was still blowing, the geese were still calling, and football was as dull as a poorly tempered knife after it's skinned a deer. I put my long handles back on, tied my pacs, pulled a stocking cap over my ears, zipped up my down jacket, and went back out. The temperature hadn't gone up any; by morning it would be near zero. I got home after dark, stiff from the cold and out of coffee again. No deer had been moving. The geese were still coming.

SUNDAY DAWNED as cold as the prediction. The snow had nearly stopped, but the wind hadn't. I knew when I swept the snow off my stand the morning would be long if a buck didn't come quick. By 10, I'd enjoyed about as much of it as I could stand. I took home half a thermos of coffee and drank it at the kitchen table. Pro football was worse than the college games had been the day before. By 2:30, I was shuffling around the house like a buck disappointed in the rut. My wife said, "I thought you were a deer hunter."

By 3, I was in the pickup headed west out of town. I punched the tape into the cassette—"My heroes have always been cowboys." Yeah, I thought, mine too. But I wasn't going to wear a wide brim and no ear flaps in this cold. There are practical reasons to wear the big hat, rain and sun being two; and there are aesthetic reasons, big-country feel being one. But when the mercury drops near the bottom of that tube tacked on the north wall of the barn, practical is way better than frostbit ears. When I got out to open the fence for the drive through the hay field, the wind was still up and the mercury hadn't moved.

The clean snow around my stand had only one set of tracks blowing full of snow—mine. The stand looked as bleak up there in the wind as it had been that morning. I pooled my knowledge of physics and meteorology and reasoned it'd be warmer on the ground. Putting my reasoning to the test, I walked 300 yards northwest and found a cozy, tight triangle of three small cottonwoods. I stood in the lee of one facing between the other two, the thicket across the clearing to the south. Even if no deer showed, I was pleased to be going through the motions. I was warmer than I'd been for a day and a half.

I slung my rifle over my left shoulder, muzzle down, and took off my warm gloves. I put on unlined buckskin shooting gloves and shoved my hands into my pockets. I leaned against the gray ridges of cottonwood bark and scanned the sky, the clearing around the hide, then settled in to watch the thicket. I was warm. Satisfied I'd not die in my sleep, I smiled and closed my eyes to the swish of dry leaves, the occasional creak of swaying trees, and flying goose sounds.

When I opened my eyes, the sky had taken on the darker gray of when the winter sun is near down. The snow made light patches under the black bulk of the thicket. The geese still flew, I was still warm. This was more fun than TV football—it wasn't any more active, but my chances of participation were a whole lot better. And a nap standing up feels as good as one lying down. The snow had stopped.

ONE OF THE SMALL pleasures of life is looking at a thicket, near the ground, imagining those dark trunks being deer legs. A bigger pleasure is in making them become deer legs. I was trying to do that. I would stare at open

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